Aalto University
School of Science
Master's Programme in Information Networks

Jenna Leinonen

How to make strategic product roadmapping decisions in a medium-sized software product company?

Espoo, 25.11.2019

Supervisor: Prof. Risto Sarvas
Advisor: MA Jukka Kortesoja

Aalto University
School of Science

Author: Jenna Leinonen	**ABSTRACT OF THE MASTER'S THESIS**
Title of the thesis: How to make strategic product roadmapping decisions in a medium-sized software product company?	
School: School of Science	
Department: Computer Science	
Number of pages: 74	**Date:** 25.11.2019
Major: Information Networks	**Code:** SCI3047
Supervisor: Prof. Risto Sarvas **Advisor:** MA Jukka Kortesoja	

Product roadmapping is an activity to make long-term decisions about the future steps of a product. In recent years, product roadmapping has been recognized as a critical activity in software product companies. It provides focus and clarity for the product development and other stakeholders of the company.

The goal of this research was to gain rich empirical findings about product roadmapping phenomena through one case company that is a software product company in a financial industry. The aim was to understand how commonly recognized challenges in product roadmapping appear in the case company and also, to identify successful product roadmapping practices. The research was conducted as an action research and a few practices were tested during the research project in the form of a collaborative workshop in the case company.

The results of this research indicate that common product roadmapping challenges are also found in the case company in the financial industry. Product roadmapping lacks transparency and is mainly done by the leaders of product management and product development. Prioritization has been mainly based on individuals' expertise and knowledge and some customer feedback, but not clearly linked to strategic planning. Results also indicate that annual budgeting may be the reason why roadmapping is used mainly as a tool for short-term planning, rather than long-term planning. Furthermore, customer wishes and feedback seem to drive the process to be more reactive than strategic one.

On the basis of the research findings, a well-planned and facilitated cross-functional collaborative workshop was experienced as one successful product roadmapping practice. In addition, utilization of customer segments in tangible way and using business and customer value metrics as part of the prioritization seem to clarify the decision-making.

Keywords: product roadmapping, product roadmaps, long-term product planning	**Publishing language**: English

Aalto University
School of Science

Tekijä: Jenna Leinonen	**DIPLOMITYÖN TIIVISTELMÄ**
Työn nimi: Miten tehdä strategisia tuotetiekartta-päätöksiä keskikokoisessa ohjelmistotuote-yrityksessä?	
Korkeakoulu: Perustieteiden korkeakoulu	
Laitos: Tietotekniikan laitos	
Sivumäärä: 74	**Päivämäärä:** 25.11.2019
Pääaine: Informaatioverkostot	**Koodi:** SCI3047
Työn valvoja: Prof. Risto Sarvas **Työn ohjaaja:** TaM Jukka Kortesoja	

Tuotetiekartta-prosessissa (tuote-roadmapping) on tarkoituksena tehdä pitkän tähtäimen päätöksiä tuotteen tulevaisuuden kehitysalueista. Viimeisimmissä tutkimuksissa tuotetiekartta-prosessi on tunnistettu yhdeksi kriittiseksi toiminnaksi ohjelmistotuote-yrityksissä. Prosessi keskittää tuotekehitystoiminnot tärkeimpiin kehitysalueisiin ja luo selkeyttä tuotteen kehityssuunnista myös muille yrityksen sidosryhmille.

Tutkimuksen tavoitteena oli tuottaa rikkaita empiirisiä löydöksiä tuotetiekartta-ilmiöstä yhden kohdeyrityksen kautta, joka on ohjelmistotuoteyritys finanssialalla. Tavoitteena oli ymmärtää, miten yleisesti havaitut tuotetiekartta-prosessihaasteet näkyvät kohdeyrityksessä, sekä myös tunnistaa onnistuneita tuotetiekartta-käytäntöjä. Tutkimus tehtiin toimintatutkimuksena ja muutamia käytäntöjä testattiin työpajassa, joka järjestettiin kohdeyrityksessä yhdessä yrityksen eri sidosryhmien edustajien kanssa.

Tutkimuksen tulokset osoittavat, että yleisesti havaittuja tuotetiekartta-haasteita löytyy myös kohdeyrityksessä, joka toimii finanssialalla. Tuotetiekartta-prosessi ei ole riittävän läpinäkyvä ja sitä tehdään lähinnä tuotehallinnan ja tuotekehityksen johdon kesken. Priorisointi perustuu myös lähinnä henkilöiden omiin kokemuksiin ja asiantuntijuuteen sekä asiakaspalautteisiin, mutta se ei ole selkeästi yhteydessä strategiseen suunnitteluun.

Tulokset myös viittaavat siihen, että vuosittainen budjetointi saattaa olla syy siihen, miksi tuotetiekartta-prosessia käytetään enemmänkin lyhyenajan suunnitteluun, kuin pitkän tähtäimen suunnitteluun. Lisäksi, asiakastoiveet ja -palautteet näyttävät vievän prosessia enemmän reaktiiviseen kuin strategiseen suuntaan.

Tutkimuksen löydökset osoittavat, että hyvin suunniteltu ja fasilitoitu monialainen työpajatyöskentely koettiin onnistuneena käytäntönä osana tuotetiekartta-prosessia. Lisäksi, asiakassegmenttien käsittely konkreettisella tavalla ja liiketoiminta- sekä asiakasarvon käyttäminen osana priorisointia näyttävät selkiyttävän päätöksentekoa.

Avainsanat: roadmapping, tuotetiekartta, pitkäntähtäimen tuotesuunnittelu	**Kieli:** englanti

ESIPUHE

Tämän esipuheen kirjoittamiseen päättyy (ainakin toistaiseksi) pitkä opiskelurupeama ja opiskelijaelämä, joka jatkui ensin lukiosta suoraan AMK:iin hakemaan insinöörin paperit. Sieltä matka jatkui vielä eteenpäin Aaltoon ihmiskeskeisen tekniikan pariin Infolle. En olisi ainakaan vielä lukiossa osannut kuvitella, että minusta tulisi vielä joku päivä diplomi-insinööri, mutta tässä sitä nyt ollaan!

Kiitos Accountor Finagolle, joka antoi mahdollisuuden toteuttaa dipan tärkeästä ja ajankohtaisesta aiheesta. Isot kiitokset kaikille Finagolaisille, jotka osallistuivat tutkimus-haastatteluihin ja työpajaan – ilman teitä ei olisi tätä dippaa syntynyt! Finagon Design-tiimiä haluan kiittää tuesta, kaikista nauruista ja kommelluksista kuluneen vuoden aikana. Iso kiitos kuuluu Sallille, joka on ollut usein tukenani tämän vuoden aikana niin työn, dipan kuin muunkin elämän käänteissä.

Ristolle kiitos sparrailusta tämän projektin aikana. Kaikkien keskusteluhetkien jälkeen ajatukset aina selkiytyivät ja dippa ei tuntunut enää niin mahdottomalta projektilta. Jukalle kiitos joustavuudesta työn ja opiskeluiden yhteensovittamisessa sekä tsemppauksesta ja ohjauksesta matkan varrella.

Ystäville kiitos tuesta ja ymmärryksestä, kun en ole ehtinyt vaihtaa kuulumisia tarpeeksi usein viime aikoina. Annaa haluan kiittää kaikista huikeista Aalto-muistoista. Yhdessä olemme myös päässeet kokemaan teekkarielämää, vaikka tulimme Aaltoon ns. sivuoven kautta suoraan maisterivaiheeseen. Kiitokset vertaistuesta kuuluvat myös Saaralle ja Xiaoyulle, joiden kanssa vietin monet illat ja viikonloput kirjastossa kirjoittaen.

Lopuksi haluan kiittää perhettäni, joka on aina ollut tukenani ja kannustanut eteenpäin.
Kohta juhlitaan!

Espoossa 25.11.2019
Jenna Leinonen

Contents

List of Figures

List of tables

1 Introduction

1.1 Background and motivation

Companies today are expected to be more responsive to technological change and to manage their technological assets more strategically. Roadmapping is a flexible technique for strategic long-term planning and forecasting over-time. (Kappel, 2001) According to Albright & Kappel (2003), the main purpose of roadmapping is to explore and communicate the dynamic linkages between markets, products, and technologies over time. Albright & Kappel (2003) also report that roadmapping in today's dynamic and highly competitive environment is complex and can lead to focus on short-term thinking, often tied to the reporting needs of the budget cycle or the next deliverable. Lehtola-Karttunen (2015) describes roadmapping as a tool that helps companies to shift the focus from short-term planning to more long-term planning.

Product roadmapping in the field of software engineering is a rather new area, especially in terms of the good practices are not yet very systematically and scientifically studied. There are some roadmapping process descriptions presented in the current literature, but they all have rather similar contents and goals according to a study by Suomalainen et al. (2011). According to Lehtola et al. (2005), a typical roadmapping process gathers stakeholders from different units to plan and make decisions, and then providing a roadmap as an outcome for presenting the decisions that have been made during the process. Phaal et al. (2003) reports that many of the benefits from roadmapping are gained from the roadmapping process rather than the roadmap itself. According to Suomalainen et al. (2011), managing change is also a fundamental part of product roadmapping because the environment where the product operates changes as well the stakeholders' needs change.

Product roadmapping can be seen as a critical activity in software product companies because roadmap gives a clear focus in the product development and it provides also high-level understanding of strategy. It can also be seen as a process of structuring and arranging product development operations in order to know how to use its different resources. (Suomalainen et al., 2011) Although, recent studies show that there is a need for more cooperative, business- and customer-driven long-term planning in software product companies. Referring to Lehtola et al. (2005), companies can no more make decisions about

future development steps of a product with few key customers only, but they should use the company strategy and available market information more effectively in roadmapping instead. Suomalainen et al. (2011) also concludes that with a good roadmap the customers' needs can be met with a product that they really want and need. Thus product roadmaps can offer a competitive advantage for the company.

1.2 Research objectives and questions

Accountor Finago Oy, the case company of the thesis, is seeking more customer-centric and strategic way of doing product roadmapping decisions in order to emphasize more customer-centricity in its operations, especially in the product development. Their current roadmapping process feels somewhat outdated and the aim of this thesis is to find out the reasons for that and provide improvement suggestions to the current process.

In addition, the case company operates in a very legislative financial industry with products used for financial management such as accounting, so the goal of the research is also to understand how the industry possible affect the product roadmapping. Also, product roadmapping has not been researched before in software companies that operate in the financial industry so this thesis will provide new insights of the phenomena in a rather specific field.

Challenges from previous research serve as the theoretical background of the research as there are already rather many empirical findings available in the current literature, which are described in the literature review part of the thesis. The first objective of the research is focused on gaining rich empirical findings of the product roadmapping phenomena and its challenges through one case company. The second objective focuses on identifying successful practices for product roadmapping.

The objectives of the research are summarized below:

1. **To gain rich empirical findings about product roadmapping phenomena through one case company in a financial industry**
    - Commonly identified challenges from current research & literature serve as the theoretical background of the thesis

2. **To identify successful product roadmapping practices through one case company in a financial industry**
    - Some practices are tested together with the stakeholders of the case company.

Research questions are built around the topic of "How to make strategic product roadmapping decisions in a medium-sized software product company?"

> **RQ1:** How do commonly recognized product roadmapping challenges appear in a software product company in the financial industry?
>
> **RQ2:** What kind of practices could support product roadmapping in a software product company in the financial industry?

1.3 Scope of thesis

The case company has two main financial management products with separate product roadmapping processes and roadmaps themselves. The scope of this thesis is limited to the product roadmapping process of the company's main cloud based financial management product, Finago Procountor, that is also currently the most popular product used in the field of financial management.

In addition, release planning (requirement level, backlogs, projects) and product portfolio management (product family-level) are out of the scope of the research. The thesis will focus only at product roadmap level, meaning product roadmapping related decision-making and processes. On a time-line, the focus of the research is in the fall 2018 when the latest product roadmapping process took place in the company when the research activities started. Also, one part of data collection phase is to go through product roadmapping materials from a

couple years back to understand the big picture of product roadmapping and the development of product roadmapping practices and processes in the case company.

The results of the thesis will provide ideas for product roadmapping to be more strategic in the case company through finding means of better understanding the current product roadmapping process and its challenges. The aim of the thesis is not to update the whole product roadmapping process in the case company, but to test and provide tools and practices through action research process together with the product roadmapping stakeholders in order to improve the product roadmapping process to be more strategic in the case company.

1.4 Structure of the thesis

The first chapter of the thesis describes the background, motivation and scope of the research and also presents the research questions. Also, the context of product roadmapping is described briefly in the introduction part of the chapter.

The chapters 2-4 present the literature review part of the thesis. The first and second chapters of the literature review focus on product roadmapping literature and research by first describing the phenomena in more general level and lastly, how product roadmapping is utilized in the context of software product companies. The benefits and challenges are described after presenting common product roadmapping practices and processes in software product companies. The fourth and last chapter of the literature review describes the concept of customer value creation that has been studied recently in the field of product roadmapping. Connecting customer value creation and product roadmapping has provided insights and findings that can support product roadmapping to be more customer-centric in software product companies.

The fifth chapter of the thesis focuses on describing the research methodology. First, the qualitative research approach is presented along with the action research approach as the research was conducted in iterative way. The research had two main phases that were the following: 1) Problem diagnosis though preliminary interviews and observation and 2) Action intervention carried out as a collaborative workshop in order try practices to solve

product roadmapping related challenges. Lastly, the data collection and analysis methods are described.

The sixth chapter describes the results of the empirical research that were gained by interviews and action intervention. The first subchapter 6.1 focus on the results to the first research question that was about the challenges of the product roadmapping. The chapter 6.2 presents the results to the second research question that focus on the successful practices of product roadmapping. The results were gained through an action intervention workshop with the stakeholders of the case company.

The seventh chapter discusses the research questions in relation to the results of the literature review and other relevant literature related to the research findings. Also, implications for the case company provides the conclusions of the research and next suggested steps for the case company. Finally, the limitations of the research are described.

References of the thesis can be found from the last chapter.

2 Product roadmapping

This section introduces the concept of roadmapping based on the existing literature and research. Only in the recent years, there has been more scientific research available about product roadmapping in practice, especially in the context of software product companies, but still considerably little scientific knowledge is available about the topic.

2.1 Roadmapping in general

Long-term product planning, typically called as product roadmapping in the context of software product companies, is a technique to bridge the gap between business planning and product development (Kappel, 2001; Phaal, 2003; Lehtola et al., 2009). Albright & Phaal (2003) describes that the key goal of roadmapping is to identify and focus both strategy and product development on the few most important elements for success. In the context of software engineering and software product companies, product roadmapping is typically a separate activity from release planning, which considers more detailed requirements and their realization into product releases (Lehtola-Karttunen, 2015).

A typical roadmapping process gathers together stakeholders from different functions in the company to plan and make decisions, and provides the roadmap as an outcome for presenting the decisions that have been made (Lehtola et al., 2005). In the literature, there are various suggestions that which stakeholder groups should take part in roadmapping process in the company. For instance, Lehtola et al. (2005) argues that the most important stakeholder groups are product management, sales and channel partners, and customers. Albright (2002) reports that roadmapping is best done by a cross-functional team effort that is led by an experienced facilitator. Based on Albright's study (2002), the roadmapping process aligns the members of the team and creates team ownership of their plan, while the facilitator steers the team toward an aggressive, realistic plan. Phaal et al. (2003) speaks also for multifunctional team effort in order to provide multiple perspectives into roadmapping such as commercial and technical perspectives. Suomalainen et al. (2011) concludes in their research that all these different views are largely based on opinions and views and not on actual empirical research about how the roadmapping process is actually carried in the companies and what challenges are faced in practice.

2.2 Roadmaps

In accordance with Albright & Kappel (2003), roadmaps are outcomes of roadmapping activity and they define and communicate product and technology strategy along with a view of the future development steps. Roadmap is usually visualized time-based chart with different levels of categories. Phaal et al. (2003) presents a schematic roadmap template as a time-based chart as presented in Figure 1, including a number of layers that typically include both commercial and technological perspectives. For the individuals that take part of the roadmapping process, the created roadmap is a tool for them to communicate their objectives and plans to other corporate functions such as sales and marketing, and to partners, customers, and suppliers, for instance (Albright, 2002).

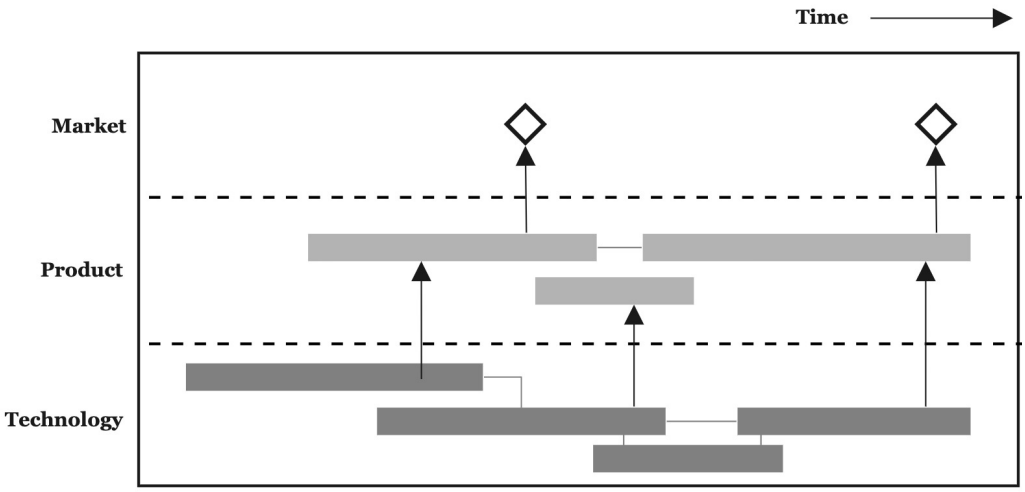

Figure 1. Schematic roadmap template aligned with technology, product and market perspectives (Phaal et al., 2003).

Mentioned by Kappel (2001), “roadmap” is a widely used and ambiguous term especially in the manufacturing industry where it also originates from. Therefore many forward looking documents tend easily to be called as roadmaps. Referring to Kappel (2001), common for all various types of roadmap documents is the time domain for each element that the roadmap contains and generally roadmaps deal with moving targets. Kappel (2001) also claims that roadmaps have a dual-nature as they are both forecasts describing what is likely to happen, but also plans by articulating the course of action.

Kappel (2001) presents four main roadmap domains in his roadmap taxonomy that helps to clarify the popular “roadmap” term by addressing different aspects of the roadmap planning problems as following:

- industry roadmaps,
- product-technology roadmaps
- science/technology roadmaps
- product roadmaps

Industry roadmap is a document in a specific industrial context and it usually communicates the technical trust and the competitive landscape by combining forecasts of technology performance, adoption and cost, for instance. The purpose of the science or technology roadmap is to understand the future by identifying trends and making accurate forecasts. The product-technology roadmap is a combination of specific product plans with technology trends and marketplace and the purpose is to highlight the links between product and successive technology generations. (Kappel, 2001)

The main goal of product roadmaps based on Kappel’s (2001) taxonomy, which is also the main roadmap domain considered in this thesis, is to communicate the direction and schedule for product evolution for both external and internal stakeholders - typically meaning customers and internal staff in the organization.

3 Product roadmapping in software product companies

This chapter covers product roadmapping in practice in the context of software product companies by describing some of the characteristics, common processes and practices of product roadmapping based on the existing literature and research. Lastly, the benefits and challenges of product roadmapping will be described based on the current research and literature. Product roadmapping in the context of software product companies is not quite widely studied yet, but the upcoming chapter will present the most recent and notable findings from the existing research.

3.1 Characteristics of product roadmapping in a software product company

Before explaining the product roadmapping in practice, the main terms are explained to better understand the process. Product as a term in this thesis means a software without customer-specific modifications meaning that the software product company serves a wide customer base with the same software product. Therefore it is the software company itself that decides how the product should be developed, which features to select and so on, in order to satisfy the customers and other stakeholders. (Sawyer 2000, cited in Lehtola-Karttunen 2015)

The focus of product roadmapping in these kind of software products companies is typically on the software features (Lehtola-Karttunen, 2015). Definition of a software feature in this thesis is based on Bosch's (2000) definition (cited in Lehtola-Karttunen, 2015) that represents a logical unit of behavior of one or multiple stakeholders of the product. Lehtola-Karttunen's (2015) visualization of a feature and related requirements is presented in Figure 2 to clarify these two terms. The visualization presents how a single feature typically groups smaller requirements together.

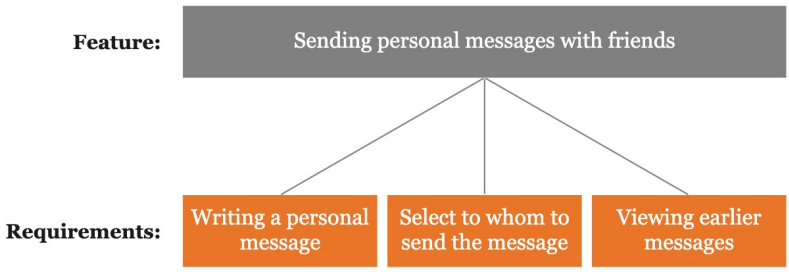

Figure 2. A feature typically groups multiple small requirements (Lehtola-Karttunen, 2015).

According to Lehtola-Karttunen (2015), there are usually two main phases in software product development where prioritization decisions are made that can be described as product-level and project-level phases. The aim of the product-level decision making, where also roadmapping activities are initialized, is to select features to be implemented in the product(s) in the long run in order to provide maximum amount of value for the customers, users and the company itself. In the project-level, the goal is to prioritize already-selected

requirements into rational implementation order meaning that at the project project-level, company deals usually with more detailed items than on the product-level in roadmapping activities.

Lehtola-Karttunen's (2015) findings indicate that product roadmapping is usually done for one product at time meaning there are usually separate roadmaps for different product and the links between other products is often lacking or it is not explicit. Lehtola-Karttunen (2015) also reports that companies deal with many other plans in addition to product roadmaps in practice, for instance business development plans and technology roadmaps, but these different plans don't often have clear links between them. It was also found out in the same study that the time-period that product roadmapping items are planned for, also called as the planning horizon, is often rather short in practice and it can typically be even only one or a few product releases ahead.

3.2 Product roadmapping processes and practices

There are various product roadmapping process descriptions, opinions and suggestions available in the literature, but not so many empirical findings exists about how product roadmapping is actually utilized in practice in software product companies. One of the most extensive research about the state of practice of product roadmapping and how product roadmapping is actually utilized in software product companies, is research by Suomalainen et al. (2011), where a conceptual framework was created in order to identify and present the essential phases and factors of product roadmapping in the field of software companies. The framework provides a comprehensive understanding of product roadmapping for both the practioners and academia by focusing completely on the product roadmapping process and describing the essential elements of product roadmapping in practice. The framework also sheds light of the perceived image of product roadmapping. The Figure 3 presents the main elements of the conceptual framework as described by Suomalainen et al. (2011) in their study.

The framework created by Suomalainen et al. (2011) indicates that even though different companies can have different product roadmapping processes and the number of phases in the process can vary, but the tasks to be done during the roadmapping process are often the same. This means that similar tasks could be still found and identified as the essential

elements of product roadmapping process in different companies. Therefore this framework fits well to explain the product roadmapping process in practice.

Phase	Essential factors
Capturing features	Gathering ideas over time and performing interviews to capture features Features come from several sources of information, e.g. market trends and standards Stakeholders include, e.g. collaborators, sales, management, product architects, and market researchers
Analysing features	Using domain-specific knowledge and experience, and interviewing experts Analysing and conducting feasibility study for major features Making a decision whether minor features fit into the product content or not Important factors: (1) verify understanding, (2) clarify implementing technology, and (3) create cost, time, and work estimations Stakeholders include, e.g. a sales representative, and people with technical or strategic perspective
Prioritising features	Using informal prioritisation methods, e.g. a calculation system Prioritising functional and non-functional requirements at the same time Several factors guide prioritisation, e.g. customer preferences, legislative and/or release specific features Stakeholders include, e.g. roadmapping team, product manager, CTO or the person in charge of the product
Roadmap validation and agreement	Validating roadmaps: (1) through negotiations, meetings or reviews to collect input and comments, or (2) through unit's business improvement, customer feedback or product's commercial success Making a roadmap agreement: in a meeting to have a mutual understanding about the product and to make the roadmap official Stakeholders include, e.g. roadmapping team, product owner, product manager, or CTO
Change management of the roadmap	Changes come from delays in product implementation or discovering new or unnecessary product features during product development Using meeting practices to handle change requests and making decisions concerning the change Roadmap's change management process: (1) change request, (2) impact analysis, (3) approve changes and verify understanding, and (4) revise roadmap Stakeholders of a minor change: product manager or CTO Stakeholders of a major change: roadmapping team

Figure 3. Conceptualized framework of product roadmapping process phases and their essential factors (Suomalainen et al., 2011).

Based on the Suomalainen's (2011) conceptual framework of product roadmapping, the product roadmapping process can be divided into five main phases that are the following:

- Capturing features
- Analyzing features
- Prioritizing features
- Roadmap validation and agreement
- Change management of the roadmap

In the following subchapters, the main idea of each phase with the empirical findings based on Suomalainen's et al. (2011) research will be presented along some other relevant literature and research.

Capturing features is a phase where ideas and features are collected for the product roadmapping purposes. Most used methods in practice are reported as collecting ideas overtime, workshops and prototyping. The ideas and features are collected typically through various information sources, such as market trends and standards and therefore knowledge

from different participants is usually needed and combined. (Suomalainen et al., 2011) Based on van de Weerd et al. (2006) study, product roadmapping receives also inputs from portfolio management. With these inputs, themes and core assets can be identified.

Analysing features

Suomalainen et al. (2011) reports that companies use various methods for analyzing the captured features for product roadmapping. Based on their research, commonly used methods are use of domain-specific knowledge and experience, and expert interviews. According to their research findings, the most important factors in analyzing features are often identified as the estimated cost, technical requirements (e.g., specific hardware needs), and the central use cases (e.g. when and how the functionality is being used, and what else should function at the same time). Suomalainen et al. (2011) also highlights that in the analysis phase, it's important to verify that the features are understood correctly and understood that what kind of technology would support the implementation of the feature. Lastly Suomalainen et al. (2011) mention that it is often estimated based on the basic understanding that how much it would cost in regarding time, money and which external resources are for the implementation.

Prioritisation of features is typically done by using informal prioritization methods instead of formal methods and prioritization can be guided by several different factors. Suomalainen et al. (2011) findings show that commonly used methods are different calculation systems that provides features points that can be weighting factors, work contributions or incurring costs, for instance. This way it can be seen which features have "won" with the highest points and then the priority order can be formed. Suomalainen et al. (2011) describes also that the factors that guide the prioritization in some companies are legislative, release specific features and real world factors as well as the number of customerships per feature or values related to technical importance, market value, or ease with return on investment (ROI). Based on their research findings, the final say of the priority is usually a collective decision by the roadmapping team or in some companies it is made by the product manager, CTO or person in charge of the product or additionally by the customer in case intermediate product versions were important for the customer. Major prioritization problems are usually reported being solved by the management team of the company.

Roadmap validation and agreement

Suomalainen et al. (2011) reports that roadmap validation is often done through reviews or unit's business improvement and feedback from the customer. Roadmap reviews take usually in the form of meetings or negotiations. Their research findings also present that reviews were more beneficial when multiple people joined the reviews to provide feedback about the roadmap and possible changes could be made to the roadmap based on the collected feedback. Suomalainen et al. (2011) also presents that roadmap validation could also be measured by customer feedback: following whether customer started to buy or not to buy the product and following unit's business improvement. Based on the product roadmapping framework, validation could be also utilized by the commercial success of a product by following the number of sold products, for instance.

Agreement of roadmap is usually made in a meeting with the roadmapping team where the goal is to form a common understanding of the roadmap and the product with roadmapping stakeholders. The agreement builds a commitment to the roadmap in the team and stakeholders and it also makes the roadmap official. In some companies, the final agreement can be made by one person, such as the CTO or product manager or the management team can also take part to the agreement meeting as well. (Suomalainen et al., 2011)

Change management

Suomalainen et al. (2011) claims that change management is seen as a fundamental activity of product roadmapping as it is seen as a continuous process in software product companies, where roadmaps gets created, reviewed and validated on a regular basis. According to Groenveld (2007), roadmapping requires an enduring examination of markets, products, technologies and the interaction between them over time. Therefore, Groenveld (2007) also concludes that roadmapping must be seen as an ongoing process that is a part of the business cycle as well. Phaal et al. (2003) adds that full value of roadmapping can be utilized only if the information in the roadmap is up-to-date which requires roadmap updates on regular basis, for instance annually or linking roadmapping to budget cycles. Although, there are several findings of negative experiences in the literature about requiring roadmap as part of the budget cycle, for instance from Lehtola et al. (2005) and Kappel (2001) that suggest the outcomes of roadmapping may be disappointing in such context.

Actual changes to the roadmap come usually in the form of delays in the product implementation phase. Major changes are often perceived as schedule changes, removing or adding important and big features to the roadmap. Major changes are usually managed by the roadmapping team and approved in the same manner as the roadmap was originally approved. Minor changes can be usually made to the roadmap in less official manner by the CTO or product manager, for instance. In addition, customers and partners can bring up changes to the roadmap as when they get informed of the current roadmap. If the customer or partner was financing the product, they usually make the final decision of the change. As a result of change management of product roadmap, there is an updated version of product roadmap. (Suomalainen et al, 2011)

3.3 Benefits and challenges of product roadmapping

Benefits of product roadmapping

Product roadmapping helps company to make long-term decisions about products (Albright & Kappel, 2003). Phaal et al. (2003) claims that many of the benefits of roadmapping are related to the roadmapping process itself rather than the end result of the process – the roadmap. According to Phaal et al. (2003), the main benefits of the roadmapping process are derived from sharing knowledge and gaining a common vision of the company's future steps with the products. Phaal et al. (2003) also describe that usually roadmapping process brings people together from different units in the organization which enables information and knowledge sharing and way to look at the problems, ideas and opportunities related to the product in a broad and holistic way.

Communication of roadmaps derives also many benefits for the company. According to Phaal et al. (2003), a visual form of the roadmap is a powerful tool for communication. Based on Kappel's (2001) definition, product roadmaps articulate the direction and schedule for product evolution for internal stakeholders and customers. Lehtola et al. (2005) highlights the importance of having roadmaps because the overall view of products and offerings has become increasingly important in software product companies as different units and stakeholders need information about future steps of the products in order to plan their own activities, such as marketing and sales.

Product roadmapping is extremely important for product development in software product companies. Suomalainen et al. (2011) suggests that product roadmapping benefits the product development by enabling early information and long-term decision making about the products in order to deliver the right products to the right markets in the right time. It was also highlighted in their research that roadmaps give a clear focus in the product development by guiding what will be done next and when. Suomalainen et al. (2011) also presents that tasks to be done can be prioritized with a roadmap and it can also guide the resource allocation of development projects. Suomalainen et al. (2011) also explains that product roadmapping improves predictability and reduces surprises in product development. It is also emphasized by Suomalainen et al. (2011) that with a good product roadmap, customer needs can be met with a product they really want and need and therefore roadmaps can offer a competitive advantage for the company.

According to Phaal et al. (2003), roadmaps provide also a high level picture of strategy and a common framework to think about strategic planning in the business. Although, to gain the full benefits with the strategic planning, multiple iterations may be needed in order to be able to drive the strategic planning process with roadmaps (Phaal et al., 2003).

Challenges of product roadmapping

One major and common challenge in product roadmapping is to find a right abstraction level and proper amount of information to be included in the roadmap (Lehtola et al., 2005). Lehtola et al. (2005) discovered in their study that too detailed and small requirements and technical contents in roadmap may result in losing the business view. On the other hand Lehtola et al. (2005) states that the more high-level and rough the content is in the roadmap, the less beneficial it might be for further development work. Suomalainen et al. (2011) also supports this finding based on their research that the more precise the roadmap was, the harder it was to maintain.

Linking business strategies to product roadmapping has been reported also as a major challenge in practice in the recent research of roadmapping. Komssi et al. (2015) findings show that urgent customer needs and short-term sales goals can complicate long-term product planning. Additionally, Komssi et al. (2015) reports that linking high-level business strategy to the complex software solution and heterogeneous customers is found to be far

from trivial. According to Komssi (2015), this causes trouble to gain a big picture of the products and offering and therefore also complicate making of strategybased product-decisions in roadmapping.

Companies can also suffer from overbooking roadmaps which can lead to firefighting-syndrome according to not yet published study by Komssi (2020). Firefighting syndrome in the context of product roadmapping means that the company develops or maintains a solution primarily based on customer complaints and requests which makes the roadmapping and customer's role in it rather tactical than strategic, based on the upcoming thesis by Komssi (2020).

Feature-driven mindset has been recognized also as a challenge in recent product roadmapping research especially in the customer value perspective that will be described in more detail in chapter 4. Development of software products tend to be technology driven, which often leads to focusing on prioritizing rather small software features in roadmapping according to Komssi et al. (2011). In addition, Kauppinen et al. (2009) explain that competition is often considered as a feature game where more and better features should be developed faster than competitors and eventually, this mindset can lead to adding too many features to the product. Kauppinen et al. (2009) study also shows that independencies between different features may not be considered carefully enough. Based on Kauppinen et al. (2009) findings, feature-driven mindset can also ignore stakeholders that don't interact with the product directly, but are still critical actors in means of success of the product. Kauppinen et al. (2009) also found out in their research that lack of customer information can lead to improving individual features too much that may not provide any value for the customer.

Recent studies also show that software product companies deal with fragmented customer knowledge in software product companies, which means that different employees know different areas of customer's activities (Komssi et al., 2015). Komssi et al (2015) found out in their study, that only a few employees had a proper understanding of the customers' activities. In addition, it is common that only a few units take part in product roadmapping in practice even though the cross-functional co-operation is highlighted as one of the main benefits of product roadmapping in the literature as mentioned in the chapter about the benefits of product roadmapping. Especially units outside product development and R&D

may have difficulties in participating and affecting product roadmapping (Komssi et al., 2015).

In addition, Lehtola-Karttunen (2015) research shows that roadmapping tend to be often strongly product manager-focused and their individual responsibility and current processes in software product companies do not support involving different stakeholders in the process systematically. According to Lehtola-Karttunen (2015), a cross-functional stakeholder co-operation can provide means to combine customer and user needs in addition to the long-term business goals in the product development context. Lehtola et al. (2005) also adds that if just one person or one function of the company has the responsibility of generating the roadmapping processes and templates, the other stakeholders may not see the benefits from their viewpoints and therefore feel unmotivated.

4 Customer value creation

This section focuses on product roadmapping through customer value perspective which has been increasingly studied in the recent literature in the context of product roadmapping in software product companies. First, the basics of the customer value concept are described based on the current literature and after that how customer value creation has been utilized in product roadmapping in software product companies.

4.1 Customer value and customer value creation

Discussions of value has tended to remain at a rather metaphorical level among experts in the field of marketing and strategy without offering a clear view of value and specifying in more detail that when and where value is actually created and by whom. Grönroos & Voima's research (2013) provides answers for these questions with a detailed definition of customer value creation which illustrates the roles of the company and the customer in different value creation spheres.

Customers do not look for products or services per se but they look for solutions which they can use so that value is created for them (Lehtola-Karttunen, 2015; Grönroos, 2015). The rigorous definition of customer value creation enables analysis and better understanding of the value creation and company's and customer's roles in there. By understanding the

nature of value creation, companies can also better influence the customer's value creation with their activities. (Grönroos & Voima, 2013)

Grönroos & Voima (2013) explain that the view of value has revolved around idea that value is embedded into companies' products and services, also called as value-in-exchange, which puts emphasis on the service provider as the value creator for the customer. This common view of value being embedded into products and therefore the company being in control of value creation has naturally ignored the customer's domain. Grönroos & Voima's (2013) definition of value creation is based on idea that value is emerges from customer's processes when they use the product or system, and the products and systems (also the companies) are only facilitators of customer value. Therefore, customers' everyday activities and their processes are the most important things for a company to know about its customers according to the value creation logic by Grönroos & Voima (2013).

Grönroos & Voima (2013) presents the value creation process by separating it into three different spheres: provider sphere, joint sphere and customer sphere that are illustrated in Figure 4. The value created in the customer sphere has been defined as value-in-use that reflects the idea of value being created when products and systems are used by the customer. The nature of value-in-use is based on a simple and very practical definition by Grönroos (2015): "It is the extent to which a customer feels better off or worse off through experiences somehow related to consumption." If there is no usage of a resource provided by the company or the usage complicates customer's processes, customer value is not created or it is negative. All in all, the value-in-use evolves in a cumulative process over time through the experiences of the usage by the customer. Value-in-use can be also destroyed sometimes which disables the customer value creation. (Grönroos & Voima 2013)

Grönroos & Voima (2013) highlights that "if companies fail to recognize the role of the customer as the creator of value, the role of the company grows out of proportion, reverting the evolution away from value-in-use and users as the creators of value, toward value-in-exchange and value for customers being embedded in producer outputs (e.g., products)." This underestimation of value creation can have critical effects in the success of a product, meaning the products may not support the customers processes in order to create value for them.

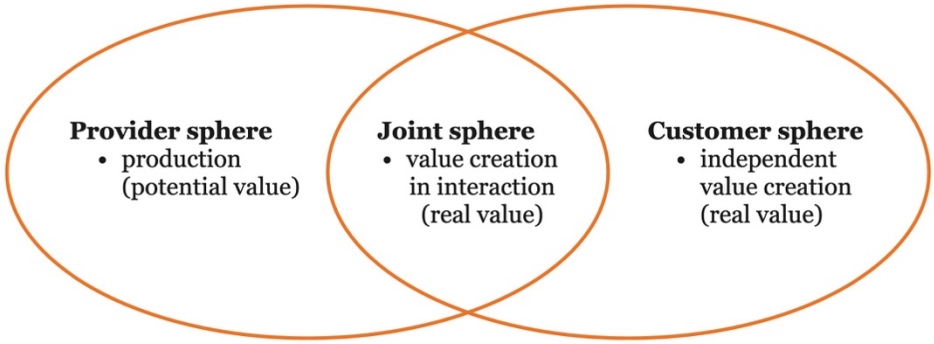

Figure 4. Value creation by Grönroos and Voima (2013).

4.2 Customer value creation in product roadmapping

The most recent research related to product roadmapping have focused on customer value creation and how it is utilized in practice as part of long-term product planning in software companies. Also, some practices have been recognized to support the link of customer value creation and product roadmapping.

As described already in the chapter 4.1, the common view in the companies, also software companies, is that value is embedded into products and systems, meaning it is produced in the development process in the company (Kauppinen et al. 2009; Grönroos & Voima, 2013). Without understanding customers and their processes well enough, company can end up developing products that do not support customers processes and create value for them (Kauppinen et al., 2009). This requires the company to focus on understanding customer's processes and activities as value is created only when customer is using products and systems. This has been recognized as a challenge in product development that is often feature-driven as mentioned in the chapter 3.3 when discussing the challenges of product roadmapping.

4.3 Practices to support customer value creation

Kauppinen et al. (2009) found out in their study, that companies have started to recognize the importance of customer value and they try to enable the value creation in their operations. Although in practice, they tend to just develop more and more features to their

products, which implicates that product features are seen as the core of value creation in software companies. Moreover, Kauppinen et al. (2009) reports that competition is seen as creation of superior product features faster than competitors.

Kauppinen et al. (2009) results suggest that companies should shift their focus from detailed features to solutions that support customer's processes. Solution in the context of this thesis means a comprehensive set of software and service components to fulfill customer needs similarly to Lehtola-Karttunen's (2015) definition. This is critical because customers value a solution as a whole including all services and not just the core product that is often the main focus on product roadmapping (Lehtola-Karttunen, 2015).

To answer to this challenge, Lehtola-Karttunen (2015) suggests companies to emphasize solution thinking in the long-term product planning activities. Solution thinking aims to widen the planning scope from product features to solution planning, which helps practioners to understand their products in more broad manner and also, to consider other value sources in addition to software. To succeed with solution planning, Lehtola-Karttunen (2015) suggests to operate as a cross-functional team in order to combine different viewpoints early enough to support the customer value creation. Moreover, it is emphasized that product managers should not be the only stakeholders to be in touch with the customers, but product developers should also be in direct contact with end users in order to understand how they use the product and what are their needs and processes (Lehtola-Karttunen 2015).

In addition, Lehtola-Karttunen (2015) also highlights the importance of making the solution planning visible by creating a simple and visual form of the solution concept by describing the customer value creation process, customer segments and components of the solution. Lehtola-Karttunen (2015) especially emphasize the importance of using the customer segments more actively in product development. An example of solution concept is presented in the Figure 5.

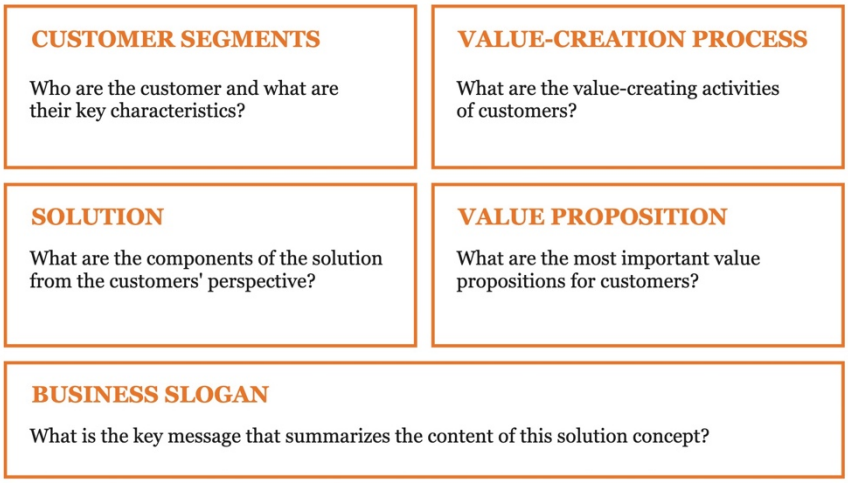

Figure 5. Solution concept by Lehtola-Karttunen (2015).

Lehtola-Karttunen (2015) also suggests practitioners to discuss the planning of business goals and resource allocations separately in long-term planning in order to see the big picture from both the business and customer viewpoints and avoid focusing on too much in details. Lehtola-Karttunen (2015) also reports that software companies tend to deal with a jungle of different plans, documents and decision-making forums that creates confusion what is actually being planned, for how long and so on. Therefore, companies should clarify all the items to be planned (such as related to strategy, solution and product) and aim to combine them in a visual format to identify the relationships between different items (also called as "planning levels") and the possible gaps in their current practices.

Komssi (2015) presents a six step approach to support customer value creation in product roadmapping. The approach requires a cross-functional team that first examines the business strategy of the software company. After that, the idea is to pick a customer segment and then identify and analyze the customer's activities. After the analysis, the aim is to map how well the current product support the customer activities and to consider the business potential of the customer activity and their priority and finally link them in to a solution roadmap. The emphasis of this process is heavily on the customers' processes and therefore it can also help practioners to think outside software features in product roadmapping.

5 Research methodology

In this chapter and upcoming subchapters, the main research methods are presented. The research approach in the thesis was qualitative in order to reach deep and comprehensive understanding of the product roadmapping and its challenges in the case company. The value of qualitative methods is in explaining what goes on in organizations (Avison et al., 1999).

The goal of the research was also to find successful product roadmapping practices that could support the identified challenges in the case company. The aim was to test the practices in the case company together with the stakeholders in iterative manner. Therefore, the research was conducted as action research as the aim was to cooperate with the stakeholders of the case company and test methods and practices in a real-life context. The action research approach in this thesis can be classified also further as participatory action research as there was an emphasis on the collaboration with the stakeholders of the company.

The research approach in the action research was inductive because the analysis was based on the collected data in the empirical part of the thesis. Previous research findings of product roadmapping challenges were background of the research. The aim was to test and provide practices in the form of action intervention based on the empirical findings of the research and also based on existing literature.

At the time of the thesis study, the researcher worked as a UX Designer in the product development of the case company, meaning qualitative research methods were rather familiar for the researcher as well as iterative research process. As an employee of the case company, researcher could also observe the practitioners and situations in the company more easily in the real context and have an active role in the research in general. The research process is visualized in Figure 6.

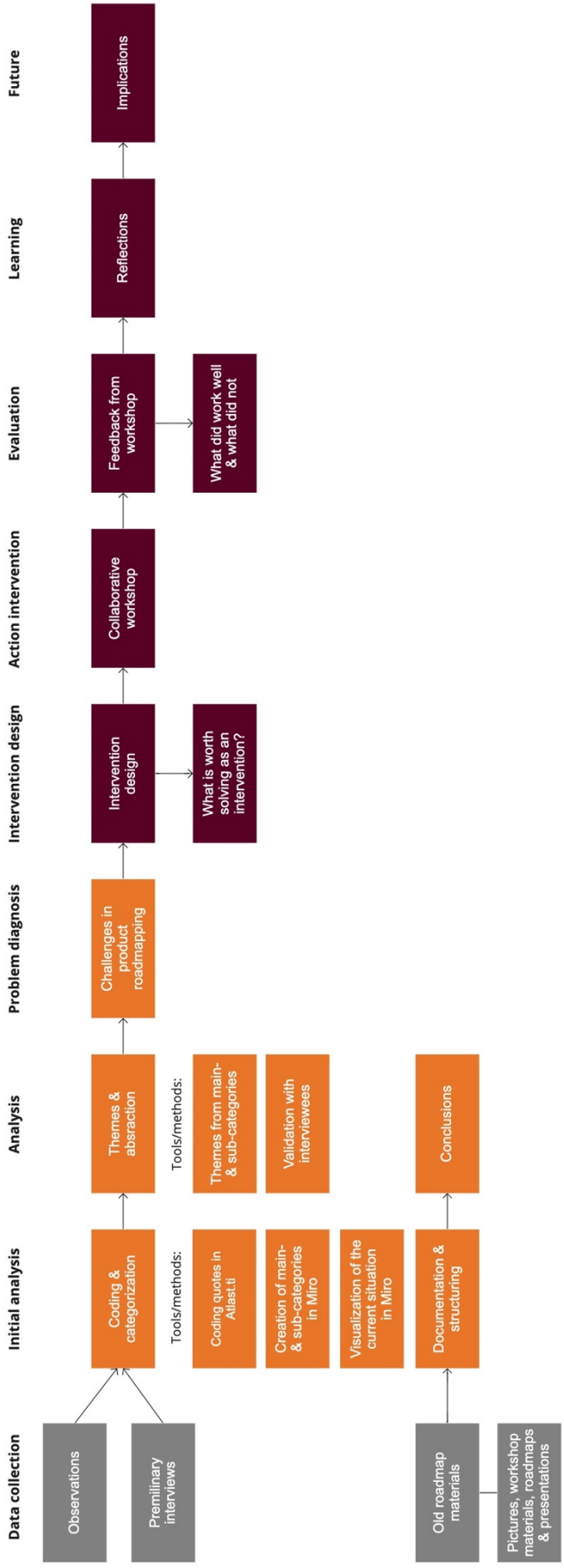

Figure 6. The research process.

5.1 Action research

Action research combines theory and practice through change and reflection in complex real-life problems and situations by emphasizing collaboration between researchers and practitioners. Action research is an iterative process where researchers and practitioners act together on a particular cycle of activities, including problem diagnosis, action intervention, and evaluation and reflective learning. (Avison et al., 1999) The main phases of action research are illustrated in Figure 7 according to description of action research cycle by Susman (1983), cited in Baskerville and Wood-Harper (1996).

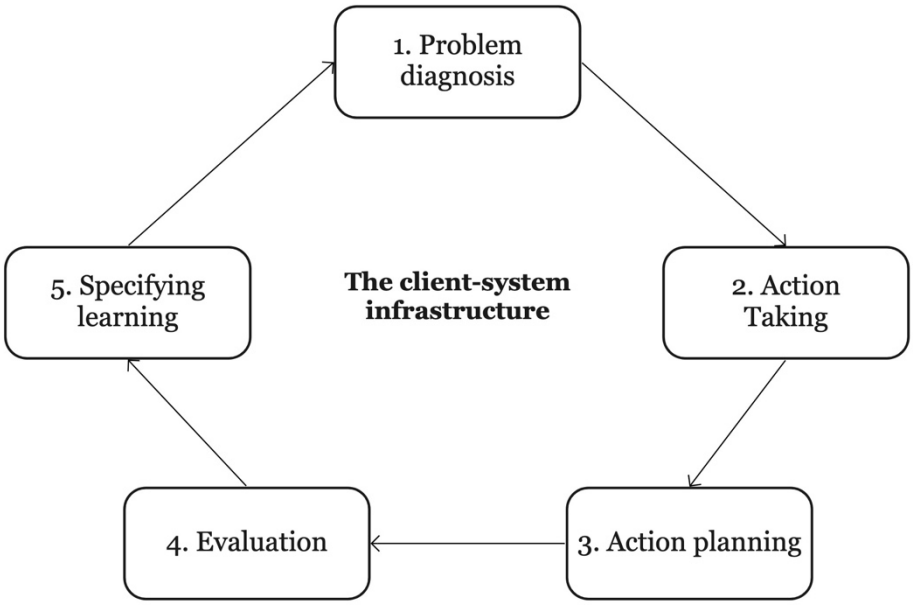

Figure 7. The action research cycle (Susman, 1983 cited in Baskerville & Wood-Harper, 1996: 238.)

In action research, researcher tries out a theory with practitioners in real situations, gain feedback from this experience, modify the theory as a result of this feedback, and try it again. The aim is to learn from the action intervention in the organization and use that learning and knowledge in order to benefit others. (Avison et al, 1999)

Action research might seem similar to case studies and even consulting. To understand the difference, Avison et al. (1999) explains that action research focuses more on what practitioners actually do whereas in case studies, for instance, the findings often describe only what the practitioners say they do. Also, if the researcher is not actually following the

tenets of action research in the real-life context, it can be described more as consulting rather than action research (Avison et al, 1999).

5.2 Data collection

5.2.1 Data collection in the problem diagnosis phase

Semi-structured individual interviews were the main data collection method to answer the first research question. The goal of the interviews was to understand the current product roadmapping process in the case company and the stakeholders' views and experiences of it. In total, 6 interviews were conducted in the case company. Interviewees were individuals from product development, business development, product management and design teams, that have been part of the roadmapping process in various ways recently or during the last few years. Two interviewee presented also the company's executive team. Interviewees have been listed in Table 1.

Interviews took place in January and February 2019 with the exception of the interview with the CTO that took place already in the fall 2018 to understand the product roadmapping in more general level in the company to kick-off the research project in the case company. Interviews were individual in order to avoid group-thinking and making it more comfortable to the interviewee to say his or hers thoughts as openly as possible.

Role	Department/team	Years in company
UX Designer	Product development/ Design	2-3 years
Product Manager 1	Product Development/ Product Management	3 years or more
Product Manager 2	Product Development/ Product Management	3 years or more
Head of Product Management	Product Development/ Product management	1-2 years
Head of Business Development	Business development and Executive board	1-2 years
Chief Technology Officer	Product development and Executive board	3 years or more

Table 1. Interviewees in the case company.

Observation in meetings and informal talks in the office was the method to support the semi-structured interviews. The researcher attended roadmap related meetings with different stakeholders, did informal discussions in the office and observed the overall feeling about the roadmapping and made some notes to document these situations briefly. The meetings and discussions were not recorded as the situations were not systematically planned beforehand. In addition, researcher collected previous roadmap materials from a few years back to see how the roadmapping process and activities have developed over the years in the company. The materials included photos of previous roadmapping workshops, product cards that have been utilized in product roadmapping, previous roadmaps and presentations about them. The materials were from between 2016 to 2018.

5.2.2 Data collection in action intervention phase

Action intervention of action research was carried out as an internal collaborative workshop in the case company. Action intervention was organized and facilitated by the researcher to tackle the challenges that were identified in the problem diagnosis phase of the action research. Because the product roadmapping challenges in the case company were quite overlapping and depended with one another, it would be more beneficial to tackle them in one intervention rather than trying to solve them separately. In addition, collaborative workshop as a way of working fit well to the stakeholders' rather tight schedules better than committing their time more often and regularly. Also, researcher had previous experience of workshop facilitation in the company so arranging and facilitating a collaborative workshop to approach the identified problems felt natural.

The main purpose of the collaborative workshop was to try to create a dialogue between the researcher and the different stakeholders in the company that have been part of the product roadmapping recently, but have not really met or discussed together around the same table about product roadmapping related issues and plans. Also, a few new practices and methods were tested in order to solve the identified product roadmapping challenges. The goal of the workshop was not to create a new roadmap or either redesign the whole product roadmapping process, but rather to show the participants the value of cross-functional team effort and to test new ways of doing product roadmapping. The main success metric of the collaborative workshop was that the participants would have gained new insights and views about product roadmapping and realized the importance of rethinking the product roadmapping in the case company.

The number of workshop participants was 6 and they presented the product development, product management, business development and user experience design teams in the case company. The workshop took 3 hours in total including small breaks between. Last 30 minutes of the workshop was spent for evaluation and providing feedback of the workshop. Workshop had three main phases that included both individual and group tasks that were facilitated by the research. Evaluation of workshop was the last part of the session. After every phase, researcher took pictures of the created artifacts (groups of post-it notes, for instance) to document them for analysis phase.

Main data collection method in the collaborative workshop was **observation** by the researcher. The role of the researcher was to facilitate the workshop, prepare all the tools and materials for the workshop, observe the session and the participants and finally, to analyze the workshop based on the collected data. Observations were recorded as researcher's notes and post-its that were generated during the last part of the workshop, where participants evaluated the workshop together with the researcher and discussed about their learnings and finally, gave feedback for the researcher. The evaluation part was also recorded as audio recording in order to go through it again as part of the analysis process.

5.3 Data analysis

5.3.1 Data analysis in the problem diagnosis phase

Data analysis of preliminary interviews

Inductive data-driven content analysis was used for analyzing the semi-structured interview data. The goal of the content analysis is to create verbal and clear picture of the research phenomenon without losing any information on the way. Rather, the aim is to add the informative value by organizing and structuring the scattered data in order to make clear and reliable conclusions. (Burns & Grove 1997; Strauss & Cobin 1998, cited in Tuomi & Sarajärvi, 2018)

Huberman & Miles (1994, cited in Tuomi & Sarajärvi 2018) divide the data-driven content analysis process into three main phases:

1. Reduction the data
2. Clustering the data
3. Creation of theoretical concepts – abstraction.

Reduction of the data is the first phase of the analysis and the aim is to reduce data by coding all the interesting parts of the data that also reflect to the research topic and questions. Before simplifying the data, the researcher must decide the proper unit that can be a single word, phrase or even collection of phrases. The aim is to provide simple expressions of the data unit that are called codes. Quotes that refer to the same simple expression can be color-

coded to separate them from other coded expressions, for instance. In addition, it is important to understand that multiple simple expressions (codes) can be created from a single data unit. After coding is done, the aim is to create a base for data clustering by going through the codes precisely and then start grouping similar codes together into a table format, for instance. Codes that refer to the same phenomenon and/or issues, are grouped together as sub-classes. The name of the sub-class describes its content – the grouped codes. (Tuomi, Sarajärvi, 2018)

All in all, 6 internal interviews were done in the case company. The analysis process began by transcribing the collected interview data by listening to the audio recording and writing down the discussion as a text document. The aim of the transcription was to capture sentences and longer breaks in the discussion but it was not ideal to capture exact and very detailed words as the aim was not to do any sort of discourse analysis, for instance. Interviews were recorded in order to be able to go back to the interview later on if needed and to avoid losing focus when doing the actual interview. Transcribed interviews were also saved and archived as text documents in case of re-analysis.

After transcribing the interview data, the aim was to simplify the data by coding interesting and meaningful quotes from the interviews that also reflect to the research questions. Atlas.ti -application was used for the coding process because it helps the researcher to manage the collected data and large set of codes more easily. Overall, around 230 codes were created from the preliminary interviews and all the codes were imported into cloud-based online white-board application called Miro (formerly known as RealtimeBoard) in digital post-it format for clustering them into main- and sub-categories. By using Miro, the codes were easily approachable regardless of the place and time and in addition, a good way to visually group the codes.

The code groups were initially formed according to the research questions. Further clustering was made by creating sub-groups from similar codes. Codes that referred to the challenges of the current product roadmapping process, were further grouped into company level, product level and product roadmapping level to understand the big picture of the challenges and how they affect each other. Under these groups, more detailed sub-groups were formed such as “Product development-centricity in decision-making”, “Listening to key customers”

and “Customer feedback-driven”, that explain and describe the nature of the challenges and current situation.

Data analysis of observations and previous roadmap materials

Data from the observations was in the form of researcher’s notes that were used to support the analysis of the interview findings. The notes were not very systematically documented as the notes were mostly collected from informal discussions and meetings in the company. The researcher went through the collected notes briefly and reflected them with the interview data. Researcher also collected previous roadmap materials in the company, such as roadmaps, pictures and tools from roadmapping workshops, that were documented in Miro-application where they were analyzed by making comments and conclusions as a text format to support the interview findings.

5.3.2 Data analysis in action intervention phase

Data in the collaborative workshop in the action intervention part of the action research was collected by observation method by the researcher. The collected data was in the form of researcher’s notes, pictures, audio recording and post-its that were created in the evaluation of the workshop by the participants. Researcher’s notes, pictures and post-its were gathered into Miro-application that was also used in the analysis of the interviews, where they were further organized and documented into themes for making the final conclusions.

During the evaluation phase of the workshop, the participants were asked to analyze and give feedback for the researcher about the workshop based on three categories:

- **Challenges:** What was challenging or difficult in the workshop?
- **Parts that worked well / were seen beneficial** in the workshop
- **Learnings:** What did you learn in the workshop?

Workshop participants wrote their thoughts into post-its based on the three categories presented above. Next, the post-its were openly presented to everyone and placed on the wall where everyone could see them ask questions or discuss. The researcher also asked clarifying questions and facilitated the arisen discussion whenever needed and took notes at the same time as well. Therefore, audio recording was taken in order to go back to the session afterwards if needed.

After the workshop, researcher digitized the post-its and uploaded them into Miro-application to create a digital version of the clustering. As a result of the process, the evaluation data was already clustered into meaningful themes and the researcher could summarize and make final conclusions based on them. Also, the audio recording was quickly recapped in order to check whether something important were missed from the researcher's notes and final post-its.

6 Results

This section summarizes the main research results of the research. The results are presented in the following subchapters in the order of the research questions that were:

> **RQ1.** How do commonly recognized product roadmapping challenges appear in a software product company in the financial industry?
>
> **RQ2.** What kind of practices could support product roadmapping in a software product company in the financial industry?

First, the results based on the preliminary interviews are presented in chapter 6.1 Results from the preliminary interviews, that answer to the first research question (RQ1). After that, the results of action intervention are described in chapter 6.2 Results from action intervention, that provide answers to the second research question (RQ2).

6.1 Results from the preliminary interviews

In the next subchapters, first the past and current product roadmapping processes in the case company are presented and after that, the challenges that were experienced by the interviewed stakeholders in the case company. Descriptions of the past and current product roadmapping practices provides the context of the case company, its processes and practices before moving into the challenges of product roadmapping in more detail. Based on the preliminary interviews, there is some gap between previous and current product roadmapping practices and there have been some frustration among the individuals that have been part of the roadmapping process recently.

6.1.1 Past product roadmapping in the case company

Product roadmapping has usually taken place twice a year in the case company – every spring and fall. The timing has been aligned with annual budget cycle as well as with big customer events, where external roadmap has traditionally been presented for the customers. The main responsibility of the product roadmapping have been on the persons in charge of product development and product management. They have organized all product

roadmapping related activities in product development and with external stakeholders as well as communicated the roadmaps both internally and externally.

The roadmap process has usually started by creating product feature cards for two separate roadmapping workshops with internal and external stakeholders. These cards have been created based on previous roadmap items, customer feedback and wishes that have been brought to the attention of the persons in charge of product roadmapping. They have also facilitated the roadmapping workshops in addition to the workshop preparation work.

Internal Product Owner -workshop

The product feature cards have been used in prioritization in the roadmapping workshops. First workshop has usually been held with the Product Owners from product development, of whom most are also financial management and accounting professionals. Therefore, they have a deep domain knowledge of financial processes that supports product roadmapping in addition to the daily development work in Scrum teams.

The goal of the workshop have been categorization of the product feature cards on swim lanes that have been based on the product vision's themes, such as "User experience", "Best Total Solution" and "Mobile". The prioritization have been based on what is seen as most important to do next in each swim lane according to the participants' expertise, experience and customer feedback that they are familiar with. New product feature cards could have been made during the workshop if requested by the participants. In addition, poker chips have been used to vote on product feature cards that the participants value the most personally. As a result of the workshop, there has been prioritized product cards on the different swim lanes.

Internal Customer -workshop

The second workshop has been usually held with internal customers from the Accountor Group. Participants have presented the Nordic countries where the case company operates in order to understand what country specific legislative and other features are needed in the product in their points of view. The participants have presented both users of the product and also some top-management from the customer company.

The goal of the workshop has been the prioritization of the products cards in the same manner with the product owner -workshop. In addition, maintaining relationships and commitment with the customer company have been big part of the workshop. As a result of the workshop, there has been prioritized product cards on the different swim lanes.

After workshops: creation of the final roadmaps

After these workshops, persons in charge of the product roadmapping have gathered the roadmap materials from the workshops in order to provide the final version of the roadmap and finally to present it for the management team to get it approved. According to the person in charge of product management, the aim of this phase is to provide a reasonable view of the roadmap based on the workshops and to remove less important items from the roadmap that are not aligned with the current development resources. This phase was emphasized as the ”role of the expert” several times in the interview because the participants of the two workshops can have very different views on what is important and needed from the customer viewpoint:

> "*Because of these two divergent views, the role of the expert was to find out a rational entity without forgetting other countries.*"
> ***- Head of Product Management***

Internal and external roadmaps

The end results of all these phases is a prioritized product roadmap, that can be utilized both internally and present it for the customers as well. In general, the generated roadmap has included product themes and software features. Roadmap items have been somewhat organized in the roadmap at year-level, but any specific dates or months are not included in the roadmap.

Currently, it is also required to have a separate and more detailed internal roadmap that communicates the use of product development resources, e.g. development teams for each roadmap item. Internal roadmap is invaluable for the product development because it includes development projects and topics that Scrum teams are going to work within the near future. Currently, the internal roadmap is a mix of resource and project plan because it represents also product development areas and the development team resources in those

areas. The product areas have been created based on the main product features and technical development, such as invoicing, salaries and architecture.

The roadmap items that are within a year from now on, are mainly big development projects that have a start and end-month and also a dedicated Scrum team from the product development area and they are also reported in the budgeting plans. It is easy to visually see which projects belongs to which product development area.

The external roadmap in Figure 8. is very simple version of the roadmap that includes features & themes only – visualized by different colors based on the themes from the product vision. The external roadmap is presented for the customers in big events one to a few times a year. It is an important communication tool for managing the customers' expectations and communicating the future steps of the product in the case company.

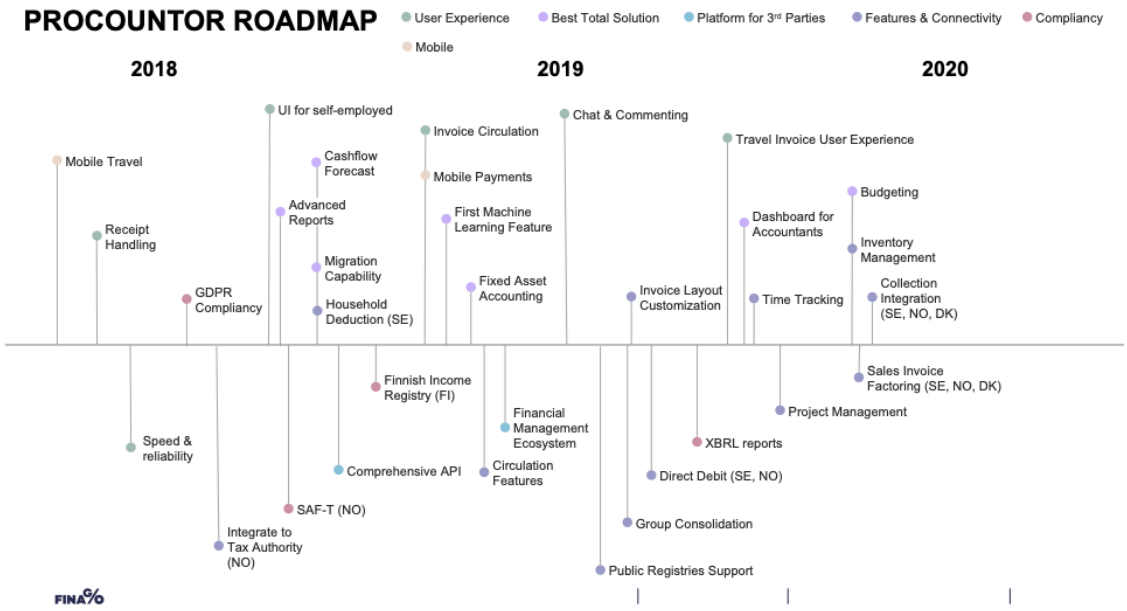

Figure 8. External product roadmap template used to external communication purposes.

6.1.2 Current product roadmapping in the case company

The case company have been going through some organizational change during the last couple of years that have affected some internal processes, organizational structure and also product roadmapping. One of the biggest changes was the merge in fall of 2017 with another financial management software provider in the Accountor Group. After this merge, the

product development was divided into two product lines and the product development department grew along the merge. Also, a new brand and name, Finago, were created for the new company. Finago product portfolio consists now from these companies' core products in addition to some other smaller financial management solutions. There are separate product roadmaps for the two main software products: Finago Procountor and Finago Tikon. The focus of this thesis is only on the Finago Procountor product roadmapping process only.

In addition to the merge of the companies, SME-cluster was also formed thereupon that represents the all financial software providers in the whole Accountor group for small and medium-sized enterprises. Currently, SME-cluster consists from three other financial software provider companies along with the case company. Also, a SME-management team was also formed to manage these cluster companies. SME-cluster management team is part of the product roadmapping process in approving the final version of the roadmap.

When the final version of the roadmap is created along with the annual budgeting needs, the roadmap is presented to the SME-management team in order to get their comments and approval. Since SME cluster have come to the picture, the roadmapping has become more and more annual budget driven. Based on the interview with member of the SME-management team, considerable prioritization decisions have been made by the SME-management team in product roadmapping recently. It was emphasized in the interview that there is a rather big gap between what is wanted compared to what can be done in fact based on the given budget and existing resources.

After SME-management team has approved the roadmap, it is shown also in the Accountor Group -management team, but the idea is not to gather comments that would completely change the roadmap but rather just make them aware of the current plans and projects and get their final approval.

Latest roadmapping cycle in fall 2018

The latest product roadmapping cycle took place in fall 2018, but it did not follow the same practices as before. For instance, workshops with stakeholders were not held, and the roadmap was formed together by the management persons in charge of product roadmapping. This was also the first time that the annual budget cycle was heavily controlled

by the Accountor corporation. Roadmap items that had not previously needed exact project plans and estimates were now required by Accountor to be precisely forecasted regarding: the length of the project, resources and costs for the budgeting plans had to be estimated beforehand.

Nevertheless, the draft of the roadmap that had been conducted by the persons alone was presented to a few stakeholders (who were also interviewed for this thesis), in order to get comments before presenting the final version to the SME-management team. Hence, the opportunity to give comments did present itself, but only at a late stage.

The product management and design teams created a forum together in fall 2018, where roadmapping -related issues and topics could be discussed between product managers and designers. The vision of the forum was to take responsibility for preparing the following roadmaps. The forum functioned as a monthly meeting with the person in charge of product management, a product manager and two members from the UX team. However, the experiences were not particularly positive based on the interviewees when it comes to actually influencing on the roadmap. Participants felt that they did not have a genuine influence on the roadmap, but rather, the forum was just about presenting somewhat finalized roadmap to them.

> *”I don’t remember anyone saying anything bigger there. I must have said something once. So far, it [the roadmap] has been ready-made, planned and ’locked’ that providing feedback and comments have mostly been nominal.”*
> ***- UX Designer***

> *”The roadmap came back in the second meeting, but there was not much to say as it was already going to the budgeting round.”*
> *-* ***Product manager 1***

Also, cooperation between Business development team had been increased by arranging monthly meetings with the persons in charge of product development, product management and business development. There has been a need for cooperation between these stakeholders on roadmapping because business development provides business cases and

activities that also requires space in the product roadmap in order to create capabilities for business partners.

> *"We may have needs for new business development that must be put to the roadmap in time in order to create capabilities for our partners or for both our company's and the partners' common cause. "*
> ***- Head of Business Development***

6.1.3 Challenges of product roadmapping (RQ1)

In this chapter, the challenges of product roadmapping based on the preliminary interviews are described. The overall feeling and experiences of roadmapping have been quite frustrating recently among the interviewees. Also, the interview results do not offer much of a surprise related to the commonly identified product roadmapping challenges in the current literature. Identified challenges have been listed in Table 2 below.

Identified product roadmapping challenges
1. Lack of transparency
2. Product development and management centricity
3. Lack of shared strategic planning and big picture
4. Customer wishes and feedback driven process
5. Roadmapping is focused on short-term planning and budgeting
6. Feature driven-mindset

Table 2. Identified product roadmapping challenges.

1. Lack of transparency in the product roadmapping process

The interview findings indicate a lack of transparency in the product roadmapping process as stated by four out of six interviewees. Especially, it has not been clear what the current situation is and how the final decisions have been made: where, by whom, and based on

what information. Some channels were created between the persons in charge of product roadmapping and design and business development in order to cooperate in roadmapping, but the cooperation has not been very effective according to the interviewees. Some of the interviewees were shown a version of the roadmap last fall and were asked apparent questions about it, but possibilities to influence were still low.

As a consequence, those who have participated in roadmapping workshops and meetings actively before, have felt like they have been left out of the process recently. It has caused frustration and confused feelings, and left them wondering what their role is in fact in the process. This is exemplified in a comment made by one product manager: "If the process could be clarified, one could understand how to influence it [the roadmap]. There is still no information about whether this is the final roadmap or not". The same product manager, who previously had regular meetings with customers, continued: "I'd like to know who does what, based on what criteria, how customers are taken into account and who is responsible for maintaining the customer information. Now it [the roadmap] just circulates somewhere and we may have something to say".

> *"If the process could be clarified, one could understand how to influence it [the roadmap]. There is still no information about whether this is the final roadmap or not"*
> ***- Product Manager 1***

> *" I'd like to know who does what, based on what criteria, how customers are taken into account and who is responsible for maintaining the customer information. Now it [the roadmap] just circulates somewhere and we may have something to say."*
> ***- Product Manager 1***

Another interviewee, a UX designer, who had been participating in roadmapping for the first time in the fall 2018, agreed with the lack of transparency: "Although I was part of the process and have been in the company for a long time always wanting to know where things come from, how they are decided, what happens after and who finally approves them etc. One cannot get the big picture… no one really knows".

"Although I was part of the process and have been in the company for a long time always wanting to know where things come from, how they are decided, what happens after and who finally approves them etc. One cannot get the big picture no one really knows."
- UX Designer

2. Product roadmapping is very product development and management-centered

Product roadmapping has been very product development and management -centered in the case company, while other functions such as sales, consulting and marketing outside product development have not participated in the roadmapping related activities. Product roadmapping has mostly been seeing as planning of the upcoming features, development projects, and resource allocation between the persons in charge of product management and product development, based on their expertise and knowledge of customers and feedback. Final approval of the roadmap has been done at the company's management level.

Internal workshops have been held in the past as a part of roadmapping, but recently, internal teams and individuals in product development have not been actively part of the process, leading to frustration, as mentioned in the previous chapter. Even product managers from the product management team feel they have not had real influence on roadmapping recently, and there is no clarity concerning to which extent they are going to participate in the next roadmapping:

"Product manager should really do all those [customer] meetings and have an influence on the roadmap. We will see how much we can influence the spring's roadmap."
- Product Manager 1

Although there has been some cooperation between other functions, improvements are still needed according to the interviewees, especially in the decision-making point of view, as mentioned by the interviewee from the Business development team: "Old ways of making decisions are not enough anymore. I would say that the cooperation has constantly improved, as well as how we have been able to provide requirements by new business partners into the roadmapping. There are still improvements to do in product development."

“Old ways of making decisions are not enough anymore. I would say that the cooperation has constantly improved, as well as how we have been able to provide requirements by new business partners into the roadmapping. There are still improvements to do in product development.”

- Head of Business Development

While emphasizing the improvements in cooperation, the interviewee still described the roadmap-level decision-making as rather inward, and pointed out that it has not been rigid enough; lacking visibility of milestones and clarity.

“In a way, defining the roadmap and deciding what is going to be done, has probably happened a little inward. The process has not been rigid enough. I can't say what kind of milestones there would have really been. ”

- Head of Business Development

In order to influence the roadmapping and provide ideas, active arrangement of meetings and even “lobbying” of persons responsible for the roadmap has been required according to the interviewees. Internal competition and politics seem to affect the outcome of the roadmap, as those who are loudest may have better chances at affecting the roadmap, leading to a somewhat biased roadmap rather than a strategic and customer-centered one. As stated by one of the interviewees, these kinds of internal politics seem to drive the process rather than a strategic approach that is based on potential customer segments, for instance. In fact, the interviewee calls out for a more systematic use of the internal tools and knowledge that already exist in implementing a more customer-centered approach.

“Whoever is the best at to lobbying gets their voices heard rather than being systematically thought that who our potential customers are and then would start to prioritize them and see what are the most important features for these customer groups."

- Product Manager 2

"The channels are pretty well covered but there is room for improvement to utilize them in a more systematic way.”

- ***Head of Business Development***

"The UX team has been involved in the process recently which is really good, but I think there's a lot more knowledge, skills and understanding - the kind of tacit knowledge - inside the house that could be utilized as well."

- UX Designer

3. Lack of shared strategic planning and big picture in roadmapping

The interviews point out that there is no common view and clarification of whom the product is for and why at the product level and it is not visible either in roadmapping. For instance, roadmap prioritization have not really taken customer segments into account in a strategic and customer-centric way, but primarily it has been mainly based on individuals' expertise and knowledge and some customer feedback, which can lead to a rather biased roadmap as mentioned in the previous chapter. For instance in roadmapping workshops, it has been "trusted" that participants can put themselves into customers' shoes and consider prioritization broadly due to the lack of "clean and clear rules" as stated by the person in charge of product management.

"It's an area [product vision/strategy and customer groups] where we don't have a clean and clear set of rules, but we rely on people being able to keep both their eyes open."

-Head of Product Management

"In a way, if we knew to whom we are doing this and if we had a decent strategy, it would be more easy to make those decisions. "

- Product Manager 2

Current product vision has not been utilized in the roadmapping process recently, but it has mainly been part of the roadmapping communication when roadmaps have been presented both internally and externally. Product vision does not clearly determine target customer groups, their needs and value propositions, but rather describes the product in feature level such as "available in different devices" and "scalable and reliable technology base" which may not support roadmapping that well. Product vision has been created 5 years ago and it has not been updated since and either used in the product roadmapping recently, so it may not answer and support the current market and customer needs.

Currently, there is no clear and shared product strategy available that would describe the big picture and context of the product along with the product vision. In addition, company strategy and vision is very profit-driven and high level, which makes it rather difficult to link it to a more detailed feature-level roadmap. Furthermore, the company strategy seem to also lack a vision of the most important customer segments which can lead to problems and unclarity at the roadmap level, too. Clearly, there are challenges in linking roadmapping into company and product strategy and utilize them in product roadmapping.

When it comes to the highly legislative financial management industry where the case company operates, legislative requirements and features cover about 25% of the roadmap items and they are considered as the first priority in the case company. Legislative roadmap items are requirements and features that are required by the tax authorities or by the accounting legislation. For instance, one remarkable and recent legislative feature was the salary function updates that the new Finnish Income Register required. Although, one interviewee mentioned that not all legislative requirements may not be really "mandatory" to implement if they are not relevant to the company's customer segments and business strategy:

> *"It could be a business decision, for example, if something comes up in a particular customer sector- so in theory, our business decision could be to not make it [a feature].*"
> ***-Head of Business Development***

4. Customer wishes and feedback driven process

Customer feedback from customer service is the main customer knowledge channel in roadmapping. The customer feedback is handled in ticket format and it is available in the ticket system used in the agile development work. Product and Area owners are the main responsible individuals in handling customer feedback and providing the information to other stakeholders in product development.

In addition, some key customers are met and heard regularly and their feedback is considered in roadmapping. Prior to fall 2018, roadmapping workshops were held with the Accountor corporation representatives about prioritization of the roadmap items. Although according to the heads of product development and management, this has been mainly done

for commitment and maintaining internal customer relationships rather than gaining major insights.

Some interviewees expressed that the direct customer feedback seem to drive the roadmapping and it can cause sudden changes to the roadmap as “responding to the jungle cry [customer feedback] “ and if something have been “promised to do for someone”’ without considering the strategic point of views more carefully, for instance. Also, by reason of customer feedback is mostly about complaints and reactions about current features, it (customer feedback) seem to drive the roadmapping to be rather reactive and keep focus mainly on current features rather being future-oriented and strategic.

> *"The roadmap should have answer to How -question and support the strategy. Now it in a sense just responds to the jungle cry [customer feedback].”*
> ***- Product Manager 2***

> *”Doing things that has been promised to somewhere.”*
> ***- Product Manager 2***

5. Roadmapping is focused on short-term planning and budgeting

The roadmap of the upcoming year is planned in detail based on business cases made for the annual budget, and development teams are allocated to the roadmap items during the first year. The timeline of the latest roadmap in the company is two years, of which the first year is very detailed planned with team and product area allocations, whereas not much happens during the second year of the roadmap.

This indicates that annual budgeting may be the reason that roadmapping is used mainly as a tool for short-term planning, rather than long-term planning. Utilizing roadmapping for short-term planning may be problematic because it lacks a view to the future, as the person from business development states: “It [roadmapping] needs to be more future-oriented, to reflect where we are heading and what it requires from our product”. Also, introducing major changes in roadmap may be difficult if ones have been strictly committed to the annual budget plans which makes the roadmap rather fixed than flexible one.

"It [roadmapping] needs to be more future-oriented, to reflect where we are heading and what it requires from our product".
-Head of Business Development

It was also pointed out in the interviews that it is dangerous to adjust the roadmap strictly with the budget plan because unexpected situations may come around: "That we promise to do development with certain amount of money is a bit dangerous, because everything can happen and come up."

"That we promise to do development with certain amount of money is a bit dangerous, because everything can happen and come up."
-Product Manager 1

6. Feature-driven-mindset

Product roadmapping has mostly been considered as planning of the upcoming features, development projects, and resource allocation between the persons in charge of product management and product development. Both internal and external roadmaps have been mainly included quite specific software features. In the product roadmapping workshops product feature cards have been utilized that represent software features to be implemented to the software. The cards also include an estimate of the expected financial impact of the feature (growth, revenue) and targeted user groups in the form of checkbox list.

All in all, prioritization has been mainly about prioritization of software features, which is a challenge especially in the customer value point of views that would require more attention to the customers, users and their processes. It was also highlighted in the interviews, that if there was more clarification of the main customer groups, decision making would be easier in product roadmapping than it currently is. Roadmap related discussions have been rather feature-centered and it has been expected that there are quite a clear picture and plans of the software feature in place when the implementation starts in the development team.

Also, the product development have been grouped according to the product feature areas in the software, which supports the feature driven mindset in product development but also in product roadmapping. Feature driven mindset causes also problems when trying to link them

into business and other strategic plans, as features are often rather small details compared to more strategic plans and documents. Also, according to the interviews, there is a feeling that too many new features are planned to be implemented and the current features and software components do not get enough of focus and attention in product roadmapping.

> *" We haven't done this many new features before when we mainly did mandatory things [legislative features]."*
>
> ***- Product Manager 1***

6.2 Results from action intervention

In the following subchapters, action intervention including the results and lessons learnt are described. First, the practices and methods initialized in the workshop will be presented and after that, the results and lessons learnt of the utilized practices and methods.

Action intervention of the action research is based on one iteration that was conducted as a collaborative workshop in May 2019 with stakeholders in the case company. The workshop was arranged and facilitated by the researcher to tackle the main challenges that were found in the problem diagnosis phase of the action research. The identified challenges are listed on the Table x below including practices that were tested in order to answer to the identified challenges:

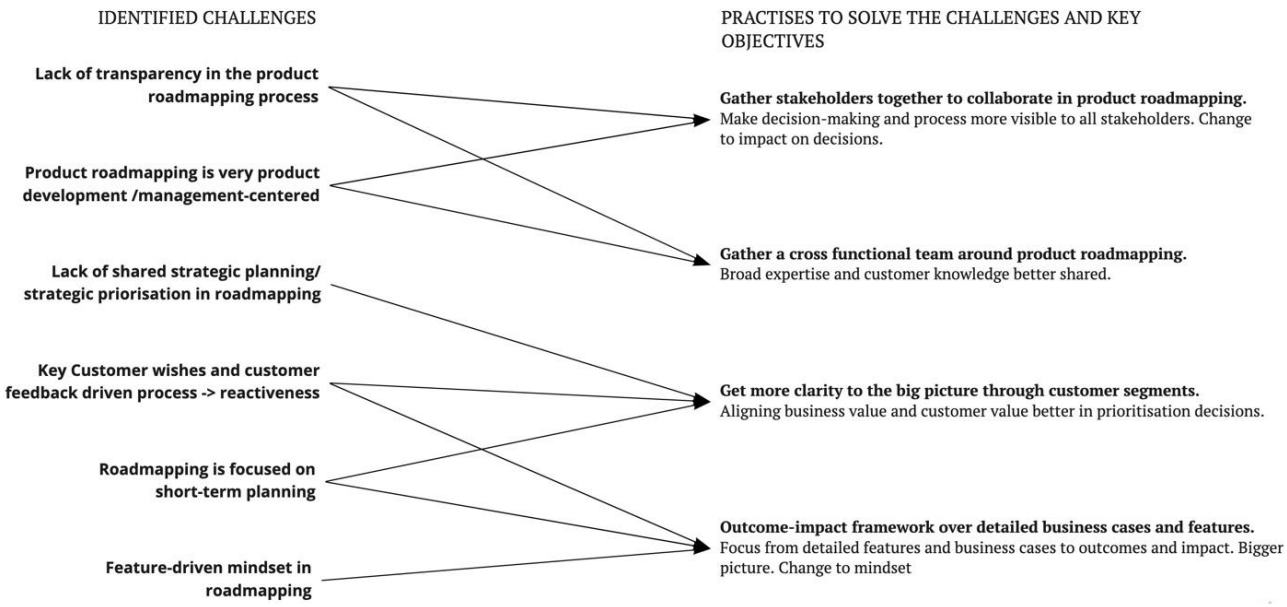

Figure 9. Identified challenges from the problem diagnosis phase and tested practices in action intervention.

6.2.1 Key practices and methods in collaborative workshop

The main purpose of the collaborative workshop was to try to create a dialogue between the researcher and the different functions and stakeholders in the company that have been part of the product roadmapping recently, but have not really met or discussed together around the same table about product roadmapping related issues and plans. Also, a few new

practices and methods were tested in order to solve the identified challenges. The goal of the workshop was not to create a new roadmap or either redesign the whole product roadmapping process, but rather to show the participants the value of cross-functional team effort and to put emphasis more on customer value thinking in product roadmapping that had not been utilized before. The main success metric of the collaborative workshop was that the participants would have gained new insights and views about product roadmapping and realized the importance of rethinking the product roadmapping in the case company. The main phases of the workshop are summarized in Figure 4 below.

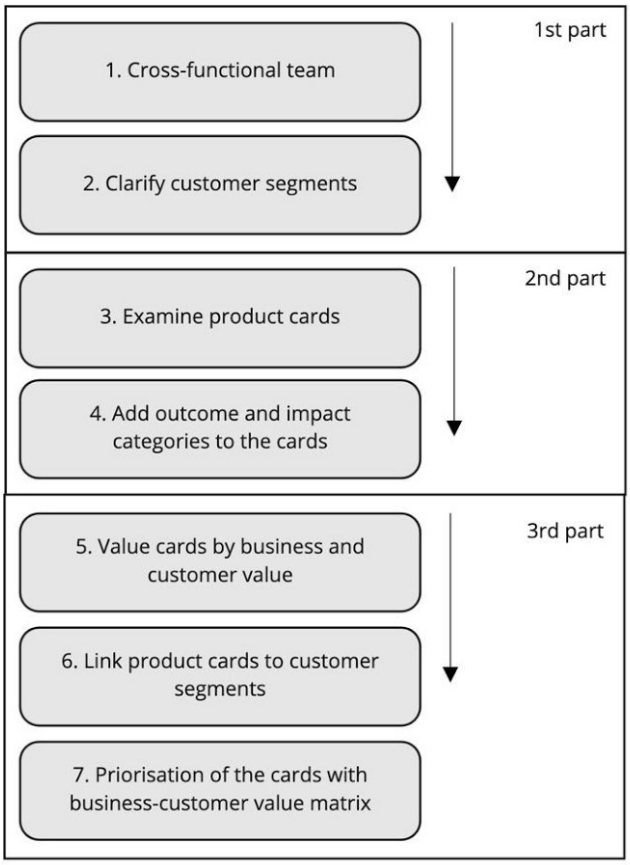

Figure 10. Main phases of the collaborative workshop.

1. Cross-functional team

Lack of transparency and product development and management centricity in product roadmapping process were the main identified challenges. Recently, product roadmapping have been done mainly at the product development management level and other

stakeholders have not actively been part of the process which had caused frustration among stakeholders. It was also proposed in the preliminary interviews that roadmapping should be done in more cooperative way and give stakeholders more changes to affect on the roadmapping related decisions with their expertise.

The number of workshop participants was 6 and they presented the head of product development (1), product management (2), business development (2) and user experience design (1) teams in the case company. Two out of six were also members of the management team that approves the roadmaps for the annual budgeting plans. 4 out of 6 participants took part in the preliminary interviews of the research.

Researcher invited the participants to the workshop based on their previous experience in roadmapping, willingness to participate in product roadmapping discussions based on the preliminary interviews and finally, broad knowledge of customers. In addition, persons in charge of product roadmapping and the members from the management team in the company were invited as they have the final say when it comes to roadmapping. Also, person from sales team was also contacted to participate to make the team more cross-functional, but due to tight schedules and individual's zero experience in product roadmapping was a personal barrier for a sales person to participate. Although, one participant instead of the sales person participated from Business Development team. The person had previous experience from sales operations in the company, which was seen very valuable expertise for the workshop.

All things considered, the idea was to collect different expertise from the company in order to gain a more holistic view to the product roadmapping and to share insights and customer knowledge better and make them more visible for different stakeholders. The participant selections were briefly discussed with the individuals in charge of product roadmapping and with the advisor of the master's thesis from the company as the nature of action research is highly cooperative between the researchers and practitioners. In the end, the researcher was trusted to make the final participant selections based on the knowledge of the thesis topic and experience in the company.

Participants did both individual and group tasks and discussions in the workshop. The goal was not to create a new roadmap or either redesign the product roadmapping process as an

end result, but rather to show the participants, and especially the individuals in charge of product roadmapping, the value of cross-functional team effort in terms of sharing knowledge and widening the thinking from budget and feature driven roadmapping.

2. Clarity to customer segments

It was found out in the problem diagnosis phase that there is no common view and clarification of the target customer segments or either a clear and shared product strategy at the product level and it has not been very visible either in recent roadmapping. Thus, the workshop began by conducting a customer segmentation exercise that would guide the participants during the workshop. The goal was to identify the most important customer segments according to the participants in the given time (30 minutes in total) based on their expertise, knowledge and current company strategy in order to create a common understanding of the customer segments and to use them later on during the workshop.

The exercise begun by listing current and potential customer segments individually on post-its. Also, the company strategy was printed out to the walls of the workshop room so that it could be reflected as well during the exercise. After the individual part, participants presented their post-its to everyone and they were asked to divide them into similar groups on the wall. After grouping all post-its, it was time to prioritize the customer groups together into top three most important customer groups. As a result, there were 8 prioritized customer segments on the wall.

The second part of the workshop begun by examining the product feature on a table individually for a few minutes. The goal was to get familiar with the product feature cards and get ready for the next part where they had to be modified in a new way.

3. Outcome-impact framework over detailed business cases and features

To change the mindset of product roadmapping being short-term business planning and consider mainly software features, new Outcome-impact framework was introduced in the workshop. The aim of the framework is to understand the desired outcomes and their impact that the roadmap is trying achieve with its items (Tate, Lombardo, 2018). The framework was originally introduced in the Mind The Product-website and their book.

Main idea of this phase of the workshop was to use previously used product feature cards. Researcher had prepared new versions of product feature cards that had been used in previous product roadmapping workshops a year ago. The new cards were based on the current items on the roadmap because there was no use to create and ideate new roadmap items for the workshop as the idea was not to create a new roadmap in the workshop but to test new ways of working and new practices. So, the focus was on the current roadmap items that were also rather familiar for the participants.

The cards were simplified compared to the previously used cards by removing the concerning user roles, financial impact (growth, revenue and mandatory legislative feature) and country specific information. The idea was to fill in the cards during the workshop and not give ready-made cards for the participants but utilize the customer segments created in the customer segment exercise in the workshop. The idea was also to use the outcome-impact framework to widen participants thinking from detailed features to clarify the bigger picture of the roadmap items and their impact. There were 12 cards altogether even though the current roadmap had more items than that, but that was considered as an ideal amount of cards to be utilized in the given 25 minute timebox.

To begin with the exercise, researcher introduced the participants to the outcome-impact framework by showing them a short video clip of it from Mind The Product -website (Tate, Lombardo, 2018). After that, participants had to fill in the feature cards together by describing on post-its the outcomes and impact for each product feature card based on the Tate & Lombardo's article (2018):

1. **What is the outcome of this feature in different stakeholder group? (Customers, internal stakeholders)**
    - *Outcomes are the behavior change you are trying to drive. What problem does that feature solve? If we solve that problem, what is the outcome we want to see?*

2. **What's the impact of the outcome?**
    - *How do we know that there has been an impact? What kind of metrics we need to measure the impact?*

As a result, most of the product cards had outcome and impact descriptions. It was not necessary to have all cards filled as the timebox was quite tight, but rather test the framework with a few product cards.

4. Value cards by business and customer value

To widen the picture of product roadmapping in the company from annual budgeting planning and business cases and to emphasize more strategic and customer-oriented viewpoints, researcher introduced customer value thinking briefly to participants during the workshop. This was the main and last phase of the collaborative workshop and it included three main sections that are summarized below:

1. Use of poker chips to indicate business and customer value of each product feature card
2. Match customer segments to product feature cards
3. Use business and customer value prioritization matrix to prioritize product feature cards

1) Use of poker chips to indicate business and customer value of each product feature card

In the first section concerning business and customer value, the main idea was to give the product cards customer and business value poker chips. Participants valued the cards individually by giving them business and customer value poker chips that participants had six of both. Business value poker chips indicated the value for the company itself and its business – shortly fulfilling the company's business needs and goals. On the opposite, customer value poker chips indicated the value that is proposed for the customers with the feature on the roadmap. The business and customer value poker chips could be used in the way that the individuals wanted to, based on their experiences, knowledge and feedback. For instance, one could give all customer value chips to one product card if participant thought it would be extremely valuable for the customers.

After providing poker chips on the cards individually, it was time to recap and discuss the end-result together and organize the cards on the table into prioritized order based on the amount of poker chips. At this point, poker chips could still be adjusted if participants felt so and the goal was to see the overall picture of the business and customer value meaning that the prioritization was not very rigorous at this phase. After participants were contented

enough with the organized cards and their poker chips, there were prioritized cards on the table. Timebox for this section was 17 minutes in total including the individual part.

2) Link customer segments to product feature cards

In the second section of this phase, the aim was to match the previously created customer segments to the product feature cards that now had also the business and customer value poker chips on them. The aim was to communicate the main customer segment that the feature was concerning the most. Participants could examine the customer segments that were still on the wall and write new post-its on the product feature card indicating the main customer group of the product feature card. The aim was to provide all cards the main customer segment. Multiple segments could be attached to one product card in case the feature was seen equally important for multiple segments. As an end result, the product feature cards were assigned with the main customer segments.

3) Use business and customer value prioritization matrix to prioritize product feature cards

Third and last section of this phase was to prioritize the product feature cards one more time based on their business and customer value that were set in the first section with the poker chips. The main goal was to use simple business-customer value matrix to visualize the prioritization between customer and business value. The matrix was drawn to the table with Y-axis for business value and X-axis for customer value. The scale range of the matrix was simply from low to high that fit well to the nature of both rather abstract concepts of value. The top right corner section of the matrix was for product cards including high amount of both customer and business value indicating that those would be ideal features to develop for both the company and the customers. The area was limited for only for four cards to avoid too many cards being there and make participants do more rigorous prioritization decisions. Bottom -left corner section on the other hand was for cards that lacked both business and customer value or had low amount of them. The bottom-right area was for cards that included high amount of customer value but low amount of business value, and the top-left corner the opposite way. The idea was to collaboratively arrange the product feature cards to the matrix in 20 minutes of timebox. As an end result, the product cards were prioritized in the matrix.

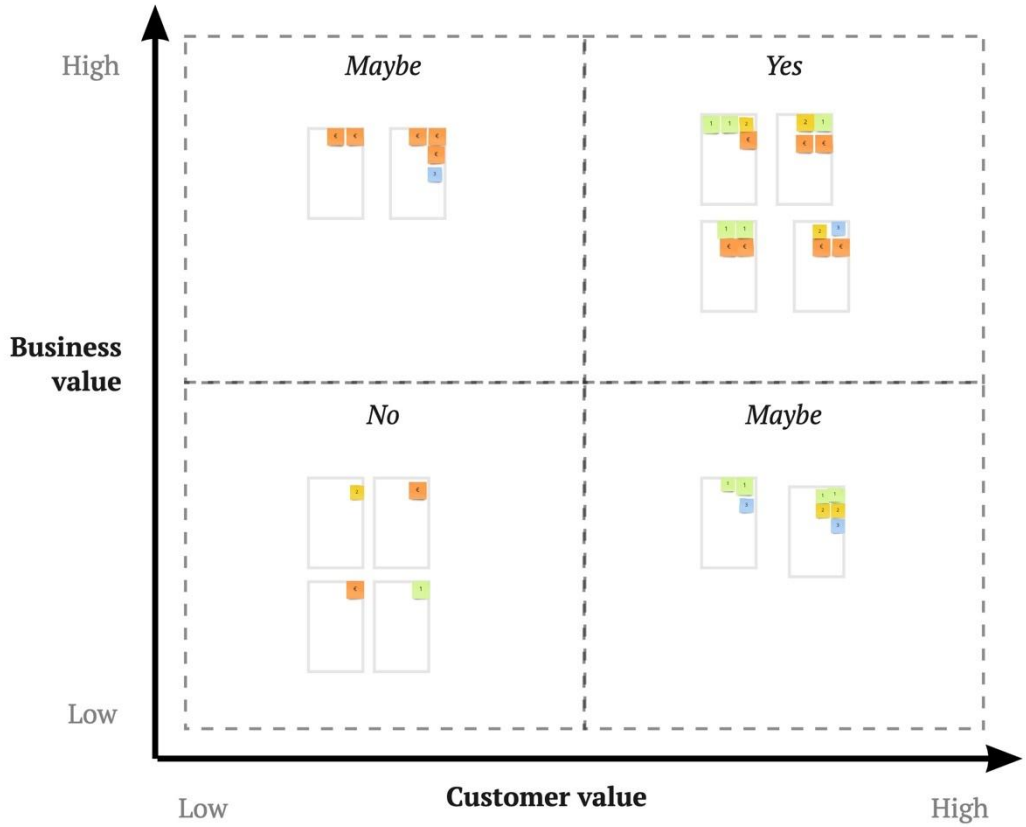

Figure 11. Business value and customer value -matrix that were used in prioritization.

6.2.2 Results and lessons learnt (RQ2)

In this chapter, main results and lessons learnt from the collaborative workshop in action intervention phase are described. The results and learnings are presented in the chronological order of the practices and methods that were utilized in the workshop. So, the structure follows the previous chapter *6.2.1 Key practices and methods in collaborative workshop*.

1. Cross-functional team

1) Sharing knowledge and insights was experienced valuable

Collaboration as cross-functional team in the same physical space was experienced very positively and valuable by the participants. Participants especially highlighted the possibility to share knowledge and learn new information was much essential and needed. For instance, participant from Business Development team explained that he learnt more about new products and product features during the workshop. In addition, participant from UX Design team summarized that she gained all in all great insights and understanding of the history

of the product roadmapping practices and background of the current products as a result of great discussions, which she experienced very valuable to regarding in her role. It is also important to note that 5 out of 6 participants continued the discussion 30 minutes overtime around the same table after the workshop had officially ended. This indicates that it was really meaningful for them to be able to talk and share information.

> *"This was good and fun! I wish I could do more stuff like this."*
> ***- CTO***

In the bigger picture, it was discussed and realized that product roadmapping should be done more at the stakeholder level where the best customer knowledge and expertise exists. The current company policies and practices require the approval of management team, so the management team cannot be taken out of the process, but there is a need to think new ways to cooperate with them and other stakeholder groups in product roadmapping.

2) More stakeholders needed but then process might require scaling

Participants highlighted that the amount of people in the workshop and the 3 hour timebox was well suitable for the purpose of the workshop and it was straightforward to work as a rather small team. Participants seemed to really understand the value of cross-functional team in product roadmapping as they even got excited about how to involve more stakeholders from other functions in product roadmapping. For instance, questions arose on how to involve the sales team who have great amount of insights on customer expectations and needs and they have the knowledge of the greatest obstacles in selling, for instance. In addition, Area Owners who are responsible of the product areas in product development unit, were seen an important stakeholder group to include in product roadmapping as well, because they manage and handle customer feedback data as part of their role.

There were also discussions whether developers should be involved in product roadmapping in order to further improve the visibility of product roadmapping. This was realized by the participant in charge of product roadmapping and product development, that this kind of way of working is an excellent way to engage people and bring more purpose to their job. Another participant agreed to that by reflecting the current situation where the product roadmap just comes out suddenly from somewhere "Here it is, do this!" -way, which might not be that meaningful way to communicate roadmap.

It was also mentioned that if the amount of participants increase, the timebox might have to be increased and also if there are more product cards used, for instance. Therefore, the workshop might get rather heavy and then the company might not accept that kind of usage of work time, explained by the person in charge of roadmapping during the workshop evaluation.

3) Importance of good workshop preparation and facilitation skills

Workshop preparations and facilitation got thanks from the participants of the workshop. One participant highlighted that it was easy to be in the workshop as everything was planned well and thought through. Also, it was emphasized that it was good that the facilitator did not participated to the tasks by writing the posts-its for instance, but was only focused on the facilitation. Instructions and timing were experienced smooth and the timing especially got special thanks since it was transparent and clearly communicated both out loud and in the workshop materials so participants would always know what's the timebox of a task and how much there is time left and so on.

> *"It was really easy to be here as everything was well-thought and planned."*
> ***- Participant from Business Development***

There were also discussions about group dynamics because one participant had concerns whether "right" decisions were done in the exercises in the workshop and whether the current roadmap will be affected by the prioritization exercises in the workshop, which was not the goal of the workshop. It was learnt that it's important to communicate the purpose of the workshop clearly and emphasize it regularly during the workshop.

Also, cross-functional, and even a bit of experimental collaboration, might be a new way of working to some people and negative reactions can therefore also occur and they can affect the group dynamics. This was realized by the researcher that it is important to get the right mindset to the participants so that there is not too much of worries about doing the "right" decisions immediately. Participant from the UX team noticed the same and also reflected the situation during the evaluation part:

"How can we get everyone to focus on the experimentation in a way that everything does not have work perfectly immediately. Here we can test and iterate how this can be developed and scaled."

- UX Designer

2. Clarity to customer segments

1) Utilization of customer segments in tangible way to help to understand the big picture

Utilizing customer segments in tangible way on post-its on a wall was experienced beneficial by the participants. For instance, one participant praised that it helped him to comprehend the big picture and it made him really think right from the beginning of the workshop. It was also seen beneficial that the customer segments were visible all the time during the workshop so it was easy to go back to them whenever needed. For instance, matching the customer segments in to the product cards was seen essential.

"Customer grouping was a good thing in the beginning and it made you really think and it also helped structure the big picture."

***- Participant from* Business Development**

The customer segmentation exercise provided also insights and realizations for the participants on how certain customers actually somehow "control" the decision-making at roadmap level with their loud feedback and requests, which stakeholders tend to easily remember. As an example of this realization, a separate customer segment called "Loud complaining customers" was in fact formed during the exercise. The participant in charge of product roadmapping explained that to get rid of these loud customers' affection, authentic customer feedback comments could be utilized more in product roadmapping to see how much certain customers really take their mindshare:

"This was an 'aha moment' that we must get the customer to be more present here. They don't have to be here present physically, but we need customer insights in a way that we can utilize them better as a mass and not just a loud 'hecklers'. "

- CTO

So, it was realized that the customer feedback must be handled and understood more carefully in product roadmapping, so that the loudest current customers do not have too

much of a share in the stakeholders' minds as one of the interviewee referred to it as "responding to the jungle cry" in the problem diagnosis phase.

All in all, customer segments were done in rather generic level due to the time limit and because the overall goal was to create a common understanding of the target customer segments in order to be able to utilize them in different ways during the workshop. Still, participants commented that more detailed user groups could have been analyzed at some level as they are important especially in the development projects in product development. Also it was highlighted that more effort and information would be needed in order to create better understanding and groups of potential customers.

It was also observed by the researcher that the latest customer meetings were fresh in the minds of the participants and it was easy to use them as arguments even though they would not speak for the customer segment as a whole. Therefore, there were concerns that some customer knowledge was still missing from the discussions and exercises. Participants felt that the customers were analyzed in quite abstract level in the exercise and authentic customer feedbacks could have been utilized to widen their thinking according to participants, for instance. To conclude, the exercise worked rather well in the given time as prioritized customer segments came out as the end result even though more time could have been spent on them.

3. Outcome-impact framework over detailed business cases and features

1) New methods bring new understanding and views, but require enough time

The aim of outcome-impact framework that was utilized in the workshop, was to understand the desired outcomes and impact of the roadmap items. The framework was introduced by showing a 3 minute video clip and then participants had to follow the instructions from the video and add the outcome and impact descriptions to the product cards. This was rather difficult exercise to conduct in the given time box although participants were really interested and quite fascinated about the framework and one participant even described that they should know the answers to the questions, but it was just surprisingly challenging.

> *"We should know these, but this is really challenging."*
> ***- CTO***

Researcher took a bit of risk when including a totally new framework in the workshop in a rather short timebox, but on the other hand it was an experiment on how to provide new content to the product cards and see them in a new way. The participants struggled the most with the legislative product feature cards and they did not come up with outcomes and impact metrics for them as they wanted to focus more on the other product cards that felt more straightforward. This might indicate that legislative product cards were probably perceived so "must have" that they did not bother to think about them in new ways as they should be included in roadmap anyways.

It was also suggested from the participants the outcomes and impact could have been divided into more detailed levels by describing both internal and external outcomes and impacts. Meaning that, what are the outcome for the company and for the customers and what are the impact metrics for them.

5. Value cards by business and customer value

1) Business and customer value matrix clarifies and visualizes prioritization

Working with the business and customer value poker chips and the business and customer value matrix were experienced as a good tools to visualize the prioritization and it also provided a new kind of understanding to roadmapping among participants. For instance, one participant commented that it provided a good view from both the company's and customers' side that what features should be emphasized in product development.

> *"Business and customer value brought me new understanding. I have been able to think them in my head but this visualization brought me some new insights."*
> ***- CTO***

Although, business and customer values were perceived in rather abstract terms and they did not seem to mean the same for all of the participants. For instance, one participant had hard time understanding the business value without a time axis. One participant suggested that the customer value should be analyzed separately for current and potential customer groups. Person in charge of product roadmapping highlighted that it was extremely good that there was no time-axis available in this workshop, but the focus was on the value perspectives. Still, product roadmapping require more dimensions than only business and customer value, such as time period and also estimation of the workload for the annual

budgeting, but it was experienced mainly positively that those discussions were out of this workshop according to the participants.

2) Subjective views and decision-making take control rather easily

It was also discussed in the evaluation and also observed by the researcher that some participants' own role guided them a lot in prioritization tasks as they were clearly defending the product features and customer segments that are essential in their own current projects. For instance, one participant got even a bit upset when his project was in the bottom-left "No" corner in the prioritization matrix part as it had not got enough of business and customer value poker chips. Moreover, other participant commented that he was about to give all of his poker chips for the product feature cards that considered his own work the most.

> *"One felt like putting all chips to a certain customer segment as it was closely related to one's own role [in the company]."*
> ***-Participant from Business Development***

It was discussed in the evaluation part that if the workshop would be arranged again, the prioritization would probably be different from this session. So, the decision making seemed to be rather subjective than objective according to the participants. Therefore, it should be considered extremely carefully how create shared goals and common base and understanding for prioritization.

7 Discussion

This chapter discusses the answers to the research questions, implications for the case company and limitations of the study.

7.1 RQ1: Challenges in product roadmapping

The first research question asked “How do commonly recognized product roadmapping challenges appear in a software product company in the financial industry?”. The identified challenges in product roadmapping in the case company did not offer much of a surprise, even though the case company operates in a rather specific field of financial management industry. When operating in the financial industry, it requires the company to follow 3rd parties carefully, such as the tax authorities and accounting law updates, in order to understand what new legislations and requirements mean for their product(s). One great example of this was the new Income register system that required the case company to develop and adjust their salary features to function with the new register system. In the case company, these kind of “mandatory” legislative features where indicated to cover around 25% of product roadmap items. But when it comes to the roadmapping practices and the process itself, similar challenges have been identified in previous research in software product companies. This might indicate that software product companies seem to struggle with the same problems in product roadmapping regardless of the industry and field.

As realized in previous research, many of the identified challenges are related to collecting different knowledge and expertise together in the organization in order to make long-term decisions about the product. One of the main challenges in the case company was lack of transparency in product roadmapping process. Many interviewees felt that possibilities to influence the roadmap where in fact rather low even though they were part of some roadmapping forums and meetings. There has been frustration among some stakeholders because it has not been clear to them that what their role is in fact in the process.

Similar challenges have been identified by Lehtola-Karttunen (2015) that found out product roadmapping to be often too product manager focused and units outside product development may have difficulties to participate and affect the roadmapping. Similar findings were made in the case company, but even some stakeholders inside product development and product management unit had challenges to be actively part of

roadmapping and influencing the outcomes. In the case company, product roadmapping has mostly been considered as planning of the upcoming features, development projects, and resource allocation between the persons in charge of product management and product development, based on their expertise and knowledge of customers and feedback. If the product roadmapping is mainly done in such a small forum, it is no big surprise that the process is not transparent either so these challenges seem to be depended with one and another. Lehtola et al. (2005) has similar findings where other stakeholders may not even see the benefits and therefore feel unmotivated when it comes to product roadmapping if only one unit has the main responsibility of product roadmapping. This was the case in the thesis company as well: people seemed to be frustrated and unmotivated about the current product roadmapping process.

Product roadmapping decision-making and prioritization was not seen very strategic in the case company and there were difficulties of having a common vision and view of the product. In addition, there were no clear product vision or strategies available to be utilized in roadmapping prioritization. Similar findings have also been made in small software companies, where it was reported that there is a lack of conceptual or common view of the product even in small software companies, which seem to complicate the roadmapping (Vähäniitty et al., 2009). Lack of strategic prioritization has also been recognized by Komssi et al. (2015) that sums up that often business strategies don't offer a clear guidance about customer segments for instance, that could be then further utilized in roadmapping.

Product roadmapping in the case company was experienced rather customer feedback driven and it was described by one interviewee as "answering to the jungle cry". This finding is also overlapping with the lack of strategic prioritization challenge, as urgent customer feedback and customer wishes seemed to overdrive the prioritization rather than more strategy based decisions. Similar findings are reported by Komssi (2015) where key customer's urgent needs and short-term sale pressures had overrun long-term plans in software product company. Upcoming study by Komssi (2020) describes this phenomena as firefighting syndrome, which means that a company develops or maintains a solution mainly based on customer complaints and requests. This syndrome makes the role of the customer rather tactical than strategic one. The case company seem to suffer from the symptoms of the firefighting syndrome at some level in product roadmapping based on the empirical findings as customer feedbacks as such are so vital part of product roadmapping. The challenge is to understand

the customer needs and problems behind the reactive feedback. Grönroos & Voima (2013) suggests companies to understand the customers processes profoundly in order to support them with their solutions. Christensen explains in his book (1997) that always listening to and responding to the needs of the best customers of the company, can lead to a downfall in the face of disruptive technology changes, which is starting happen in the financial and banking software industry at the present time as the use of new technologies, integrations and methods such as machine learning become more and more common in the field. Therefore gaining more comprehensive picture of the customers seem to be critical according to the recent literature. Schrage (2012) offers a concept of customer vision, that might also help software product companies in taking customers better into account in decisions and plans. He explains that companies should shift their focus from designing better products to designing better and more valuable customers through customer vision, that describes the attributes and qualities the company desires to create in its customers. The customer vision looks like a promising approach to be utilized also in product roadmapping with the customer value thinking in order to gain a competitive advantage in the financial industry that is being disrupted at the present time.

Short-term planning and budgeting were identified also as a challenge in the case company as they seemed to drive the product roadmapping to be in fact more short-term planning rather than strategic long-term planning. Annual budgeting cycle seemed to also make the roadmap rather fixed than flexible according to the interviewees. According to Albright & Kappel (2003), today's business climate can lead to a focus on short-term thinking, often tied to the reporting needs of the budget cycle or the next deliverable, which also describes the situation quite well in the case company. Product roadmapping seems to be focused on short term goals and budgeting in the case company in a way that they might have actually lost the long-term view of their product. Lehtola-Karttunen (2015) also reports similar findings that the planning horizons in product roadmapping be rather short, even only a couple releases ahead sometimes. This might also indicate that product roadmapping might not be providing some of the benefits that have been recognized in the literature, such as gaining the long-term and common vision of the company's future steps with the product(s) (Phaal et al., 2003). Also Kappel (2001) and Kauppinen et al. (2009) have reported disappointing experiences with budgeting in roadmapping in their studies.

The case company had mainly prioritized software features in product roadmapping. Feature driven-mindset in product roadmapping puts focus on prioritization of rather small software features and requirements. As Komssi (2011) have reported, feature driven mindset might be in fact causing the difficulties in seeing and understanding the big picture and view of the product(s) and therefore complicate the process of making strategy based decisions in roadmapping. This might be the situation also in the case company of the thesis, because roadmapping has been considered mainly as prioritization of software features and they were lacking also the common view of the product at some level. Lehtola et al. (2005) also describes in their study that business goals and marketing arguments are easier to link for high-level features than for individual and rather small requirements. On the other hand, it is a common challenge to find the right abstraction level for the roadmaps.

7.2 RQ2: Practices to support product roadmapping

The aim of the second research question was to gain an understanding on what kind of practices could support and solve product roadmapping related challenges in a software product company in financial industry. To gain the answers to the research question, an action intervention in the form of a collaborative workshop was arranged in the case company where a few practices were tested and utilized together with the stakeholders of the case company. The practices were chosen by the researcher based on the identified challenges and the existing literature. All in all, the action intervention workshop served in a sense as a game changer by providing the stakeholders new perspectives about product roadmapping. A new roadmap was not created in the workshop, but the workshop was rather more like a kickoff for rethinking and organizing product roadmapping in the company, especially in the means of co-operation with different stakeholders and how to get more strategic thinking and customers better aligned in the process.

Collaborative workshop with cross-functional team was experienced valuable by the stakeholders in order to gain more broad understanding and share knowledge to make product roadmapping decisions. Literature have also suggested to have a cross-functional team around product roadmapping in order to gain a better picture of the product and customer needs. Albright (2002) suggests to perform product roadmapping in a cross-functional team that is led by an experienced facilitator in order to create ownership of the product roadmapping while the facilitator is able to steer the group further. Similar

facilitation benefits related to facilitation were found out in the case company. The collaborative workshop was facilitated by the researcher and it was experienced as a great practice because that way the other participants can fully focus on the tasks whereas the facilitator is only taking care of the facilitation part.

Results of the research suggest that a small cross-functional team works well in rather intensive collaborative product roadmapping workshop. According to Suomalainen et al. (2011) study, it is common for medium-sized software product company to have 6-10 people involved in the product roadmapping process. Still, that does not have to mean that more stakeholders could not be part of the process in other ways. Multiple workshops or meetings could be arranged with different stakeholders in phases, where they can provide the needed knowledge or experience. For instance, to validate the created roadmap or provide more product roadmap items.

On the other hand, scaling issues of cross-functional cooperation were raised during the evaluation of the workshop. Stakeholders in the case company were considering how they could involve more stakeholders in the future but there were concerns on how to arrange that in practice efficiently and avoid it to be too heavy and complex process. For instance, software developers were considered as a potential stakeholder group to be included in the process in some way. Opposite findings are from Kauppinen et al. (2005) that found out that developers were actually not perceived as an important stakeholder group in product roadmapping but rather a group to provide views of the cost estimations of requirements. In the case company, building engagement and ownership among software developers was perceived as a good opportunity in product roadmapping. Lehtola-Karttunen (2015) on the other hand emphases creating direct contacts between developers and users to gain better understanding of the customers' processes.

Customer segments were utilized in the beginning of the workshop in order to create a common understanding as it was found out to be rather unclear area based on the empirical research findings. Tangible and visual workshop practices seemed to provide clarification and valuable insights during the workshop of the customer segments. Creation of customer segments using post-its on the wall revealed many valuable insights, for instance that some loud customers are quite heavily affecting the product roadmapping decisions making. Also, it was easy to reflect the customer segments during the workshop as they were visible

all the time on the wall in the workshop place. On the other hand, participants would have hoped more detailed and depth-analysis of the customer segments, which would also have required a longer time-box. Komssi (2015) highlights the importance of gaining tangible results quickly in collaborative product roadmapping workshops, especially when there are busy senior managers present. This requires good workshop preparation and facilitation skills meaning an experienced facilitator would be ideal to have in the process that was also realized earlier in this chapter.

Feature-driven mindset was challenged in the workshop by leveraging the participants' thinking into outcomes and impacts of the product roadmapping items. The utilized framework was perceived as quite challenging but also important and something that the stakeholders should actually know, but it had not been discussed within this kind of a team before in this way. Also, business and customer value-matrix was used to prioritize the product roadmapping items, which was experienced as a good & simple tool to take both sides into account and not to complicate the prioritization with too many dimensions, such as time and resource allocations. The results indicate that it might be good to use the different dimensions first separately before creating the final version roadmap, because it seemed to make the prioritization more clear and simple. Similar findings related to separating different dimensions and levels in long-term planning can be found from Lehtola-Karttunen (2015) who presents that it is easier to see the big picture from business and customer viewpoints when they are separate from resource allocation and detailed feature-level plans. According to their research, it avoids entanglement in the details and puts focus on the long-term planning, which seemed to work in the same way with the business-customer value matrix in the case company.

During the prioritization, it was observed that it can be difficult to be objective especially in prioritization phase. Participants reported that it was sometimes hard to prioritize items that were close to one's individual projects and there were doubts that if the prioritization would be done again on a different day, different results might be gained. This might indicate that there was not clear enough common ground & strategic picture and clarity on the prioritization aspects during the workshop. Strategic fit of the product roadmap items could be analyzed more carefully with a tangible tool such as a canvas, to make sure the prioritization is actually more strategic and not subjective. For instance, product vision and strategy could be utilized during a workshop to make sure the prioritization fits to the long-

term goals and objectives of the product and the company. This would mean that the product strategy and vision must be available and clear enough in order to utilize them, which was not the situation in the case company at the time of the research.

7.3 Impact of the research

In this chapter, main impacts of this research in the case company are briefly described as the focus of the action research is heavily in utilizing the learnings from action intervention. The described impacts have happened during the following months after the action intervention that was arranged as a collaborative workshop in the case company.

The main impact of this thesis research have been realized as a change of mindset in people responsible of product roadmapping in the case company. The research have helped the stakeholders to understand the challenges of product roadmapping and to talk more openly about them in order to solve them. It has also been more openly discussed that more stakeholders are needed to bring more knowledge and information to product roadmapping related activities and there is no use to do it by a few individuals only. For instance, the issue with transparency have been improved by better roadmap communication and presentation methods and by involving more people from different teams in roadmapping related meetings. The product roadmap is also more visible for all stakeholders thanks to a new digital product roadmapping tool. Also, some strategic goals have been listed to the product roadmapping tool to categorize the product roadmap items more strategically, but more work is still needed to better define and understand the strategic goals among all stakeholders.

The product roadmap is also reported to be more flexible than before as there are less roadmap items in the roadmap and therefore more space to urgent or other new development ideas. In addition, the swim lanes in the roadmap are not allocated to certain development teams anymore as how they were before. So, the resource allocation is a bit more separate from the product roadmap, which simplify the roadmapping process and the roadmap.

Also, it has been realized that customer feedback should not be utilized as such alone in product roadmapping but deeper insights are needed in order to fully understand the

customer needs and customer value. Concrete ways of doing this have not yet been utilized efficiently, but at least there's more understanding of this issue among the stakeholders. The implications presented in the following subchapter will provide suggestions and next steps for the case company to continue improving the product roadmapping.

7.4 Implications for the case company

Product roadmapping is a strategic process to make long-term product decisions. Commonly faced challenges in product roadmapping are related to linking business strategies to feature-level development plans. Also, short-term sales goals and urgent customer needs tend to complicate the process as well. In addition, lack of customer knowledge due to only one unit being responsible for product roadmapping, usually the product management, cause challenges in the process by creating unclarity and lack of transparency among other stakeholders.

Many of the issues that complicate the product roadmapping not being strategic, seem to actually be outside the product roadmapping process itself and be more organizational challenges, such as lack of understanding and utilizing the company strategy. Therefore, the following four implications are presented starting from the actions that are recommend to be done before actual product roadmapping activities.

1. Understanding the big strategic picture before making any prioritization decisions in product roadmapping

Before going straight into product roadmapping process, it could be suggested to revise available company and product level strategies and visions, that should be the foundation of all strategic decisions to be made in the company. When the strategies are clarified and revised, it might be easier to utilize them also in product roadmapping. To make the big picture of the product itself more clarified and visualized, a solution concept could be created with a cross-functional team. For instance, the solution concept created by Lehtola-Karttunen (2015) seems like a potential tool for that and it especially takes the customer viewpoint well into account. The five elements of the solution concept are the following:

1. *Customer segments*
2. *Value creating processes of the customers*
3. *Solution*
4. *Value propositions*
5. *Business slogan*

2. Clarification of customers and customer value

Also, another possible strategic practice that could be utilized is a customer vision, which shifts focus from products and features to designing the future customers (Schrage, 2012). As the financial industry is currently under big changes due to new digital services by the different authorities and utilization of AI methods, for instance, it might be essential to put some effort to understand and analyze the future customers as such. Visualized customer vision along with the solution concept could be a great opportunity to support product roadmapping, but also the daily product development activities in the company. In addition, understanding the concept of customer value as the value created in the customers processes, might tackle the problem of reacting to urgent customer needs and feedback. This require gathering the current customer knowledge from different units and teams in the company and probably also, conducting customer and user research to really dig deep into the customers processes and activities where the value will be created for them. All these steps could clarify the customer perspective and its utilization as part of product roadmapping.

3. Share strategic artefacts and understanding in the company transparently

It is recommended to share and utilize the strategic concepts and visualizations transparently in the company to create a better understanding of the product(s) and customers for all stakeholders – not just the product roadmapping stakeholders. Use of tangible strategic artefacts, such as the visions, could potentially help to make more objective decisions in product roadmapping and when everyone is aware of them, there is also more clarity and transparency.

4. Suggested product roadmapping practices

If product roadmapping is conducted in a too small and mainly in one unit's forum, knowledge and insights of customers, for instance, cannot be efficiently shared and utilized. To tackle this issue, a cross-functional team is preferred to be created that can efficiently share information and provide broad expertise on the product roadmapping decisions.

This can be done as collaborative workshops that are preferably facilitated by an experienced facilitator that guides the workshop and makes sure the goals of the workshop are achieved at the end of the day.

In the financial industry, the compliance perspective is essential part of product roadmapping as tax authorities, for instance, can come up with new requirements for software provider. So, there will always be a set of legislative features in product roadmaps, which means that the company must carefully follow what is to come in the compliance perspective. In product roadmapping this means that there should be individual(s) participating that are aware of these kind of legislative changes and news.

Also, it is suggested not to make the planning too complex by trying to link all require dimensions to product roadmap items and prioritization at the same time. Therefore it is suggested to keep resource allocation, for instance, more separate from product roadmapping. Using business and customer value dimensions together seems a promising practice in prioritization, but the rather abstract terms of business and customer value should be clarified more carefully with the stakeholders in order to achieve a common ground. Strategic fit could be part of product roadmap item descriptions in addition to customer and business value. Individual product roadmap items could be analyzed by the following aspects as an example:

- *Value for the customer*
- *Value for company's business*
- *Strategic fit: Does it fit to the strategy? Why/why not?*

These kind of checklist items could help the prioritization and improve the understanding of the product roadmap items in bigger and strategic picture than just detailed features or business cases.

7.5 Limitations of research

Research was conducted in one case company and the findings and implications were mainly formulated for the case company, which can be seen as a limitation. Furthermore, as the emphasis of action research was in collaboration with the company's stakeholders, the findings and practices may not be fully applicable for other companies and organizational contexts. Also, the researcher was an active participant in the action research by collecting and analyzing the data during all phases of action research, which may have affected the subjectivity of the research findings. In addition, the researcher had been working for the company for almost 3 years at the time of the research, which may have affected the subjectivity of the research findings as well and caused bias towards the phenomena. On the other hand, as the case company had been part of researcher's experience portfolio for such a long time, less time and effort was required in order to gain a comprehensive understanding of the product roadmapping and the context of the case company in general.

One goal of the research was to provide practices to support product roadmapping. Lack of iteration and validation during action research can be seen as a major limitation as the practices were tested only in one iteration cycle. This was mainly due to the tight schedule of the research as well as the stakeholders' schedules. Therefore there might be not enough evidence of the tested practices and methods that were utilized during the action intervention phase. Multiple iterations cycles would have been required in order to fully validate the practices and their effectiveness. Thus the action intervention results mainly provide insights and ideas for the case company in order to continue the work from now on.

Triangulation of research methods was utilized by conducting semi-structured interviews and observing meetings and having informal discussions in the case company. Previous roadmap materials, such as old roadmaps and photographs of workshops, also supported the analysis of the interviews, for instance. Although, the lack of diversity among the interviewees can be seen as a limitation as 5 out of 6 of them were from product development but had different roles in there, which may have provided biased data and in fact quite a narrow view of the phenomena. More validation and implications could have been gained by interviewing also informants from other units, such as marketing and customer service. Final results of the interviews were validated by presenting and discussing them briefly with the key stakeholders.

The results of the collaborative workshop were evaluated after the workshop by providing feedback for the researcher, but the final results and conclusions were not validated with stakeholders. Also, the feedback of the workshop was not given anonymously so the feedback could have been affected by the social relationships between the researcher and the workshops participants. Participants may have left some negative feedback out, for instance.

8 References

Albright, R.E. 2002, "The process: how to use roadmapping for global platform products.", *PDMA Visions 26,* , pp. 19–23.

Albright, R.E. & Kappel, T.A. 2003, "Roadmapping In the Corporation", *Research-Technology Management,* vol. 46, no. 2, pp. 31-40.

Avison, D., Lau, F., Myers, M. & Nielsen, P. 1999, *Action research*, ACM, New York.

Baskerville, R.L. & Wood-Harper, A.T. 1996, "A Critical Perspective on Action Research as a Method for Information Systems Research", *Journal of Information Technology,* vol. 11, no. 3, pp. 235-246.

Christensen, C.M. 1997, *The Innovator's Dilemma : When New Technologies Cause Great Firms to Fail,* Harvard Business School.

Groenveld, P. 2007, "Roadmapping Integrates Business and Technology", *Research-Technology Management,* vol. 50, no. 6, pp. 49-58.

Grönroos, C. 2015, *Service Management and Marketing: Managing the Service Profit Logic, 4th Edition,* JW Wiley.

Grönroos, C. & Voima, P. 2013, "Critical service logic: making sense of value creation and co-creation", *Journal of the Academy of Marketing Science,* vol. 41, no. 2, pp. 133-150.

Kappel, T. 2001, "Perspectives on roadmaps: how organizations talk about the future", *The Journal of product innovation management,* vol. 18, no. 1, pp. 39-50.

Kauppinen, M., Savolainen, J., Lehtola, L., Komssi, M., Tohonen, H. & Davis, A. 2009, "From Feature Development to Customer Value Creation", IEEE, , pp. 275.

Komssi, M. 2020, Customer value and solution planning, Unpublished Dissertation, Aalto-yliopisto.

Komssi, M., Kauppinen, M., Tohonen, H., Lehtola, L. & Davis, A.M. 2011, "Integrating analysis of customers' processes into roadmapping: The value-creation perspective", IEEE, , pp. 57.

Komssi, M., Kauppinen, M., Töhönen, H., Lehtola, L. & Davis, A. 2015, "Roadmapping problems in practice: value creation from the perspective of the customers", *Requirements Engineering,* vol. 20, no. 1, pp. 45-69.

Lehtola, L., Kauppinen, M. & Kujala, S. 2005, "Linking the business view to requirements engineering: long-term product planning by roadmapping", IEEE, , pp. 439.

Lehtola-Karttunen, L. 2015, *Linking Long-Term Product Planning and Requirements Prioritization to Customer Value Creation*, Dissertation, Aalto-yliopisto.

Phaal, R., Farrukh, C.J.P., Mills, J.F. & Probert, D.R. 2003, "Customizing the technology roadmapping approach", IEEE, , pp. 361.

Phaal, R., Farrukh, C. & Probert, D. 2003, "Technology roadmapping: linking technology resources into business planning", *International Journal of Technology Management,* vol. 26, no. 1, pp. 2-19.

Schrage, M. 2012, *Who Do You Want Your Customers to Become?* Harvard Business Review Press.

Suomalainen, T., Salo, O., Abrahamsson, P. & Similä, J. 2011, "Software product roadmapping in a volatile business environment", *The Journal of Systems & Software,* vol. 84, no. 6, pp. 958-975.

Tate, E. & Lombardo, C.T. 2018, *, Roadmaps are Dead! Long Live Roadmaps*. Available: https://www.mindtheproduct.com/roadmaps-are-dead-long-live-roadmaps-by-c-todd-lombardo/ [2019, 5.5.].

Tuomi, J. & Sarajärvi, A. 2018, *Laadullinen tutkimus ja sisällönanalyysi,* Kustannusosakeyhtiö Tammi.

Vähäniitty, J., Lassenius, C., Rautiainen, K. & Pekkanen, P. 2009, "Long-Term Planning of Development Efforts by Roadmapping - A Model and Experiences from Small Software Companies", IEEE, , pp. 300.

Weerd, I., Brinkkemper, S., Nieuwenhuis, R., Versendaal, J.M. & Bijlsma, A. 2006, *On the Creation of a Reference Framework for Software Product Management: Validation and Tool Support*, IEEE Computer Society.